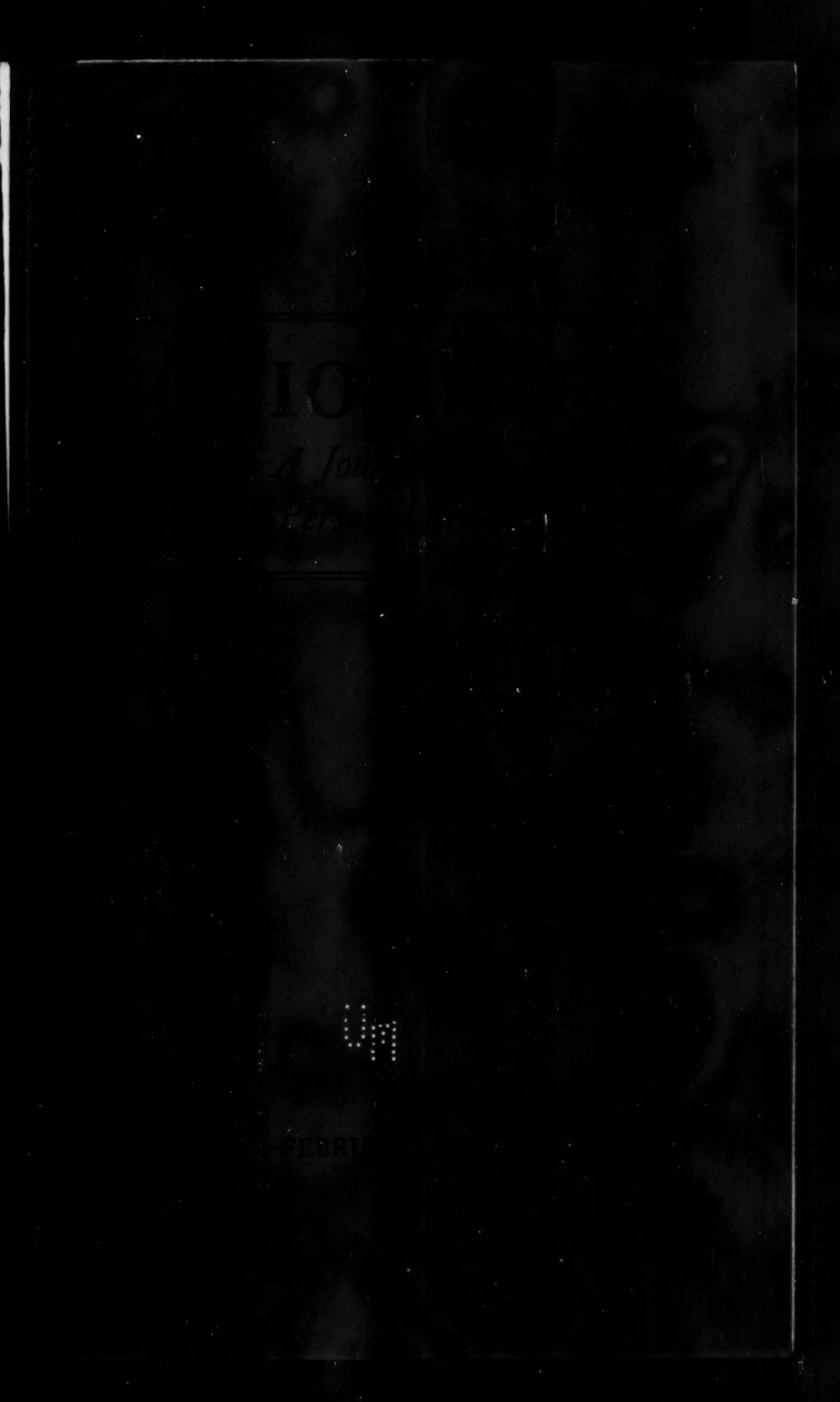

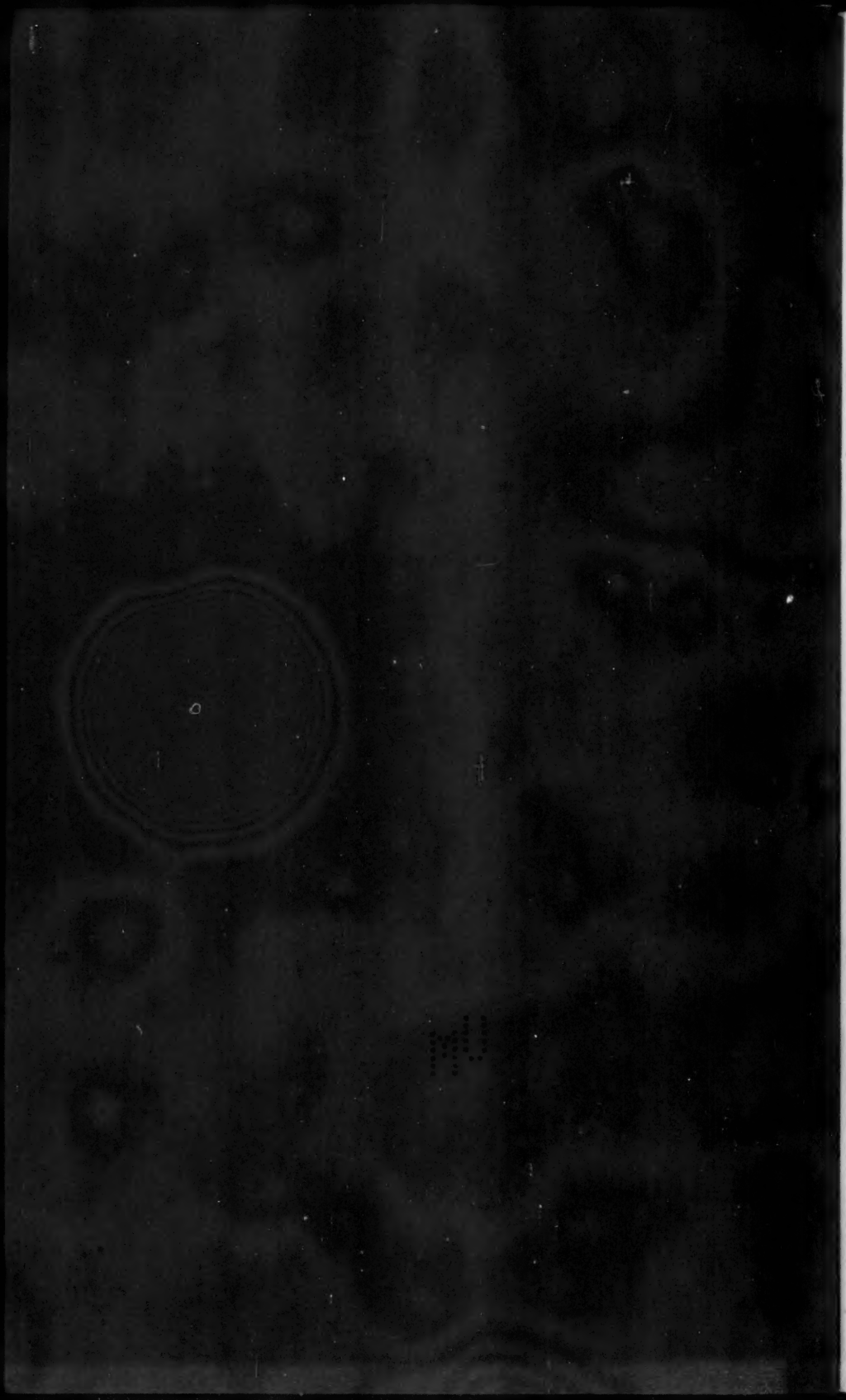

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SPONTANEITY PROCEDURES IN TELEVISION BROADCASTING WITH SPECIAL EMPHASIS ON INTERPERSONAL RELATION SYSTEMS

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Beacon, New York

PREFACE

During the last two decades, a basic change in methodological orientation has been taking place which centers on two points: the interpersonal relationship systems and the concept of the moment. In order to integrate the interpersonal relationships into the larger frame of reference of the social sciences, new tools of social measurement,[1] novel ways of presenting and evaluating findings[2] and new forms of statistical procedure had to be devised.[3] In order to bring social and cultural phenomena into the present tense, ingenious experiments and tests had to be devised, such as spontaneity and psychodramatic procedures, bringing the conceptual framework of interpersonal relationships into union with the conceptual framework of the philosophy of the moment.[4]

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[1]The sociometric test, for instance. See Moreno, J. L., "Who Shall Survive? A New Approach to the Problem of Human Interrelations," Nervous and Mental Disease Publishing Co., Washington, D. C., 1934.

[2]The sociogram, and the interrelation matrix as adapted to sociometric aims. See "Who Shall Survive?" and Moreno, J. L., Jennings, H. H., and Sargent, J., "Time as a Quantitative Index of Inter-Personal Relations," Sociometry, Vol. III, No. I, January, 1940.

[3]Statistics of social configurations, such as isolates, pairs, triangles, chains and networks of individuals, etc. See Moreno, J. L. and Jennings, Helen H., "Statistics of Social Configurations," Sociometry, Vol. I, part 2, 1938.

[4]See Moreno, J. L., "Der Augenblick" (The Moment), Berlin, 1922; "Das Stegreiftheater" (The Spontaneity Theatre), Berlin, 1923, in part translated in "The Philosophy of the Moment and the Spontaneity Theatre," Sociometry, Vol. IV, No. 2, May, 1941; and Mead, George H., "The Philosophy of the Present," London and Chicago, 1932. It appears, from the literature of the last twenty years,

It is interesting to make use of two points of reference--that is, the interpersonal relationship system and the concept of the moment--in evaluating the fine shades of variation in the sociometric movement, and the degree in which they consciously and systematically embrace these two points of reference. Among the protagonists of the older types of social measurement in which interpersonal measurement is not an integral part[5]--protagonists like Chapin and his associates--there is now a growing interest in approaching and satisfying one or the other of these two points of reference. Obviously, their tools must either be modified or replaced in order to satisfy the new methodological requirements. Among the leaders in sociology and social psychology, Jennings,[6] Cottrell,[7] Gallagher,[7] and Lundberg[8] appear to be closest to an appreciation of both the theoretical and the practical aspects of the new trend. Among the leaders in psychology, it is, for instance, Lazarsfeld's recent effort to combine public opinion with interpersonal studies[9] which may bring about a great change in the methodology of public opinion polls. Among the leaders in psychoanalytic psychiatry, Sullivan,[10] for instance, is fully conscious of the importance of interpersonal relationship systems, but he does not sufficiently stress the social and psychiatric implications of the concept of the moment and of spontaneity theory. Even within the domain of interpersonal relationship systems, an interest on his part in the sociometric aspect of them seems to be missing. Similarly, there is hardly any sociologist, social

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(footnote cont'd.)

that only in Moreno's work are both points of reference--the theory of the moment and the theory of interpersonal relations--consistently integrated within one system--sociometry.

[5]Such as the socio-economic scale, etc. See Chapin, F. Stuart, "The Social Status Scale of 1933," Minneapolis, 1933.

[6]See Jennings, Helen H., "Sociometry and Social Theory," American Sociological Review, Vol. VI, No. 4, August, 1941.

[7]See Cottrell, L. S., Jr., and Gallagher, R., "Developments in Social Psychology, 1930-1940," Sociometry Monograph, No. 1, 1941.

[8]See Lundberg, G. A., "Social Attraction-Patterns in a Rural Village: A Preliminary Report," Sociometry, Vol. I, part I, 1937.

[9]See Lazarsfeld, Paul F., "The Relationship of Public Opinion Meaeures to Sociometric Procedures," read before the section on sociometry of the meeting of the American Sociological Society, New York, December, 1941.

[10]See Sullivan, Harry Stack, "Concepts of Modern Psychiatry," Psychiatry, Vol. III, No. 1, 1940.

psychologist, anthropologist or psychiatrist who could not be classified in the most characteristic fashion, merely by reflecting on every shade of his relationship to these two points of reference.

In the course of liberating interpersonal events from their pseudo-momentary character and transforming them into interactions truly in the moment, the greatest barriers found were technological devices, particularly in the form of the cultural conserve. It became clear to us that neither a methodological nor a practical advance can be made unless we face the conflict between interpersonal relationships and the cultural conserve in all its consequences. This problem forms the true core of this paper, and is illustrated through its application to researches aimed at correlating spontaneity methods to the technological medium of television.

The frame of reference for this study is the relationship and contrast between two fundamental concepts. We have chosen to call one of these concepts "spontaneity" and the other the "cultural conserve." In the article which follows, these two terms are used in a rather special sense. The root of the word "spontaneous" and its derivatives is the Latin sponte, meaning of free will. Webster goes on to define this term as "proceeding from natural temperament. . . .or acting by internal impulse, energy, or natural law, without external force; self-acting."[11] According to Moreno, "spontaneity has the inherent tendency to be experienced by a subject as his own state, autonomous and free--free, that is, from any external influence, and free from any internal influence which he cannot control. It has, for the subject, at least, all the markings of a freely produced experience."[12] "Spontaneity is also the ability of a subject to meet each new situation with adequacy."[13] "It (spontaneity) is not only the process within the person, but also the flow of feeling in the direction of the spontaneity state of another person. From the contact between two spontaneity states centering, naturally, in two different persons, there results an interpersonal situation."[12]

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[11]From Webster's New International Dictionary, Second Edition, G. & C. Merriam, New York, 1941.

[12]See Moreno, J. L., "The Philosophy of the Moment and the Spontaneity Theatre," Sociometry, Vol. IV, No. 2, May, 1941.

[13]See Moreno, J. L., "Who Shall Survive?"

"Conserve," says Webster, "means to keep in a safe or sound state; to preserve it." It is derived from the Latin con + servare, meaning to guard.[11] We have used the word "conserve" as a noun preceded by the adjective "cultural." Thus, a "cultural conserve" is the matrix, technological or otherwise, into which a creative idea is placed for preservation and repetition. Two forms of the cultural conserve are referred to in this paper: the technological conserve, as noted above, and the "human" conserve, the conserve which uses the human organism for its vehicle. The creative idea itself, however, is "spontaneous." and the quality which pertains to the conception and materialization of such an idea is called "spontaneity." Spontaneity must always occur as the preliminary step toward the formation of a cultural conserve.

Spontaneity and the cultural conserve are tangible and observable phenomena in human experience. They are interrelated concepts; one is a function of the other. Neither absolute spontaneity nor absolute conserve can be achieved, but they have been found to be useful heuristic principles.

INTRODUCTION

One of the most important aspects in the study of interpersonal relationships is the interactive performance of a group of persons in a medium which is continuously changing, and in which the attention of the participants is shifting from one task to another without warning. Under these conditions, split-second judgment and responsive spontaneity will be most rigorously challenged. Television is a medium in which interpersonal action of the moment is the final desideratum.

A new opportunity for testing interpersonal productivity is given in television broadcasting, since it can combine in a unique fashion spontaneity of human interaction with the flexibility of a technical instrument well attuned to such an intent. The human organism, singly and collectively, has in the past been so over-conditioned and made so responsive to cultural conserve stimuli that new methods and procedures must be investigated in order to develop new reaction-patterns.

In a technological era like ours, the fate and future of the spontaneity principle as a major pattern of culture and living may depend on good fortune in tying it up with technological

devices. It is reasonable to assume that, should the spontaneity principle remain outside the powerful technological advances of our time, it would continue to be a subjectivistic expression of a small group of romantically inclined intellectuals and unable to reach and educate the public at large.

Among the technological devices capable of expression, one can differentiate between two types: the one which is designed specially to transmit cultural conserves and includes such items as the book, the gramophone and the motion picture; and the other type which includes the "neutral" devices of radio and television, which do not enforce the production of conserves, as do those of the first type. By "neutral" we mean that they are sufficiently flexible to transmit both conserves and spontaneous forms of expression. They are not at least to start with, mechanical barriers to the presentation of spontaneity.

It is now more than twenty years since radio as a means of cultural transmission had its start. At that time it was suggested by Moreno that here was given a medium which could be used for the presentation of spontaneous material; that it should be made the vehicle for instantaneous, extemporaneous influence, instead of for conserves. As we know today, the strategic moment which was offered to the radio was lost to the modern idea of spontaneous culture: it fell prey to old, established, habit-ridden conserves in man, himself. Surveying the last twenty years of radio work, we can see the whole field being practically controlled by the conserve. The psychological reasons for this decision are many. First of all, it could copy cultural models already established by other enterprises: the book, the theatre, the opera, etc. It could be bought and sold only after it had been carefully evaluated according to its commercial merits. The contents of the broadcast program could easily be controlled by any agency which wished to influence the minds of the people in accord with a given program of culture.

It is obvious that the history of the cultural conserve within man's own mental apparatus--a history dating back thousands of years--is the greatest single barrier to the infiltration of the spontaneity principle into the total pattern of present-day civilization. Today, another technological device is coming to practical fruition--television. It might easily fall prey to the conserve, as did the radio.

Let us for a moment consider the radio broadcasting situation of today, with a special effort to understand why the radio conserve succeeded where radio spontaneity failed. The

setting-up of acoustic productions in the sending station is comparatively inexpensive. What matters is the acoustic illusion produced at the receiving end. In television, however, the situation is entirely changed: the main appeal is here to the optic sense, and the acoustic is integrated into the optic--and both are again integrated into action-patterns. The dilemma with television is therefore either that it will try to compete with the perfectionism of the motion picture film--radio broadcasting has no such competition--or that it will have to search for other standards of presentation which are of a different character from the motion picture film and the radio conserve. The perfectionism in motion picture production pays because a motion picture film is repeatable and can be shown in many places at the same time or at different times. But television production is not repeatable. It is instantaneous and extemporaneous--transitory--and that is its full meaning. As soon as one tries to make it repeatable it becomes like a film and loses its central characteristic. But if it is to be momentary, the production end must keep pace with it and must reach a high degree of spontaneous flexibility. Obviously, the daily production schedule of a television station has to run such a large number of situations and acts that the motion picture film system cannot be automatically transplanted into it. A new system must be organized and introduced which partakes of some of the phases of the old, conserved techniques but is integrated with and vitalized by spontaneity methods. In the course of experimentation, it may be found that there are features to which conserved techniques can be applied, but the highest meaning of television and--perhaps--its destiny will be attained if the relationship between production and technical apparatus is similar to the split-second coördination of the air-pilot with his plane.

Carefully organized spontaneity experiments should show the bodies of people who control the dissemination of news, entertainment, etc., that television can indeed function without the use of conserves--indeed that the medium can thus become more vivid and rich in content than it otherwise would be. In view of this aim, a series of studies have been set up by us showing the applicability of spontaneity methods to the technological medium of television.

OPERATIONAL PROCEDURE OF A TELEVISION BROADCAST

Television comprises the broadcasting of light waves as registered by a television camera, just as radio comprises

the broadcasting of sound waves as registered by a microphone. Light waves are converted into electrical impulses by means of a cathode ray tube, known as an iconoscope, which is located inside the camera. These electrical impulses are then transmitted through the ether and received by a similar cathode ray tube located in the home receiving set, which converts them back into light. Thus, the spectator sees in his receiving set the identical image which is registered by the television camera at the studio.

In all the television procedures which we observed,[14] two cameras are used. One camera is supported on a comparatively simple tripod mechanism which may be wheeled around to any position on the studio floor, while the other camera is supported by a highly complicated mechanism, known as a panorama dolly, which permits the use of a wide range of camera angles. The dolly may also be wheeled around at will. These cameras are known as numbers "one" and "two," respectively. The studio proper, that is the place where the productions take place and are photographed, is known as the "floor." The productions are controlled, however, by the program director and his technical assistants who sit behind a glass partition in what is known as the "control room," which is raised on a level above the floor so that the occupants are afforded an unobstructed view of the entire production. The program director is in constant telephonic communication with the "floor crew," which consists of the cameramen, the electricians, the scene-shifters, etc., who are necessary to the mechanical functioning of the production. The crew, as well as the actors, are under the supervision of an individual known as the "floor manager," who is responsible for the smooth performance of the production as a whole, and who also relays to the production personnel orders given by the director in the control room. Figure 1 presents a schematic diagram of the means by which communication is maintained from the program director to the other members of the television staff.

The primary concern of the program director is the direction of the cameramen in the moving and changing of their cameras so that the eye of the spectator is met by a pleasing and varied continuum of camera angles. To facilitate this

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[14]The authors are extremely grateful to Mr. Adrian Murphy, Executive Director of Television of the Columbia Broadcasting System, Inc., for the permission and the opportunity to be present at a number of television broadcasts in the studios of the Columbia Broadcasting System.

procedure, there are placed before him two cathode ray tubes of the type used in a television receiving set. Each of these tubes is electrically connected to one of the cameras on the floor, thus enabling him to see exactly what each camera sees.

SCHEMATIC DIAGRAM OF PRESENT TELEVISION PROCEDURE

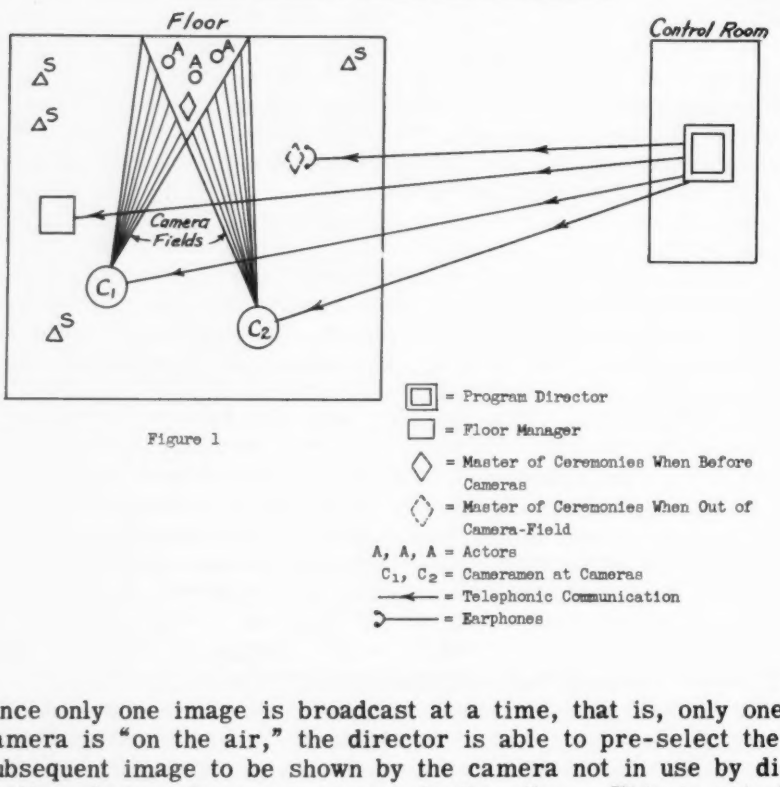

Figure 1

Since only one image is broadcast at a time, that is, only one camera is "on the air," the director is able to pre-select the subsequent image to be shown by the camera not in use by directing changes from one camera to the other. This is actually effected by a series of electrical controls operated by a technician seated directly to the director's right. The director indicates to him which camera is to be put on the air by simply saying, "'Take' One," or "'Take' Two," referring to camera "One" or camera "Two" on the floor.

OPERATIONAL PROCEDURE OF A SPONTANEITY PERFORMANCE

The premise upon which a spontaneity performance is based is that a group of persons under the leadership of a director can produce a drama or dramatize an event or experience without previous preparation for it and without any knowledge of the topical theme which is to be embodied. Thousands of experiments presented in the course of more than twenty years before large and small audiences have demonstrated that such an art of the moment is possible.

A spontaneous production is divorced from the concept of a script which is previously prepared by an individual or group of individuals (playwrights). It is a production in which every performer is an actor and playwright at the same time, evolving a drama which he and his fellow-actors make up as they go along.

The performers are trained in the spontaneous production of ideas as well as in spontaneous interaction. It is easy to appreciate a spontaneous performance in operation, but extremely difficult to put it down on paper. Usually there is the "carrier" of an idea. This may be the director, one of the performers, or a total outsider. The carrier transfers his idea to the director who, in turn, works it out with the performers. The rôles are assigned and the action begins. This idea may be only a seed. It is often more of an incentive to spontaneous thinking and action than a completely formed and postulated course of action. One scene conditions the next and, after a series of unexpected turns, an ending is reached which is at once dramatic and logical. The function of the director is to stimulate the dramatic process through strategies determined by the contingencies of the moment. He has a total view of the action at all times and is thus able to decide at what point a dragging scene should be stopped or when a weak scene should be stimulated.

The director has a number of "rescue players" in reserve whom he can send in when where they are most needed, and he can recall from the scene of action players who hinder the smoothness of production, or who have done their part and are no longer needed. The player who is acting in a scene may be perfectly able to develop it to the proper climax, but he is often unable to visualize a fitting dénouement. The director--as a participant observer, since he himself is not acting--is able to anticipate critical moments of this kind. A rescue player is instructed by him as to what character and rôle to

assume, and what action to take in order to give the drama the necessary stimulus towards either a new climax or a logical ending. The director may deem it wise, however, to dispense with rescue players if the necessary changes and climaxes come forth from the players already operating on the stage.

A large number of additional methods and procedures have been developed in the course of years of research. There is a growing literature on spontaneity techniques whose applications range from the drama, the living-newspaper and pure entertainment to the treatment of social, matrimonial and mental problems.

SUGGESTIONS FOR ADAPTING SPONTANEITY METHODS TO TELEVISION

The mechanics of televising a spontaneous performance have not so far been touched upon. We have outlined reasons why we think that spontaneity methods are distinctly applicable to television uses and the reader by this time must be wondering just how, from the operational point of view, we propose to adapt these methods to the field of television in a workable form.

In our thinking on this subject, the problem seems to us to resolve itself on one pivotal point, namely the function of the director. He is the agent through whom the various elements of the television production must flow and be correlated, and he is also the one who has the authority and responsibility of seeing that the performance achieves the desired effect. It has already been pointed out that a television broadcast resolves itself around two foci: the floor and the control room. Perhaps, therefore, it would be more accurate to say that the problem concerns the optimum delegation and apportionment of authoritative responsibility to cover these two centers of activity.

Four methods of doing this have suggested themselves to us:

Method 1. The program director would have full authority over both the "video"[15] and "floor" aspects of the

[15]This term is often used to designate that portion of the broadcast operation which is concerned with the selection of photographic images to be televised. In contradistinction, the term "floor" refers to all production activity which is operationally concerned with the management of events taking place before the cameras.

broadcast. The director would be seated in the control room and communicate with his staff of players and the camera crews via telephone, directing both groups at the same time. This would mean that each player, as well as the cameramen, would have to be supplied with a set of ear-phones so as to be able to receive orders from the director. Each player would have to remove his ear-phones each time he was called upon to go before the cameras (see Figure 2), and there would be no way

SCHEMATIC REPRESENTATION OF SUGGESTED METHOD NO. 1

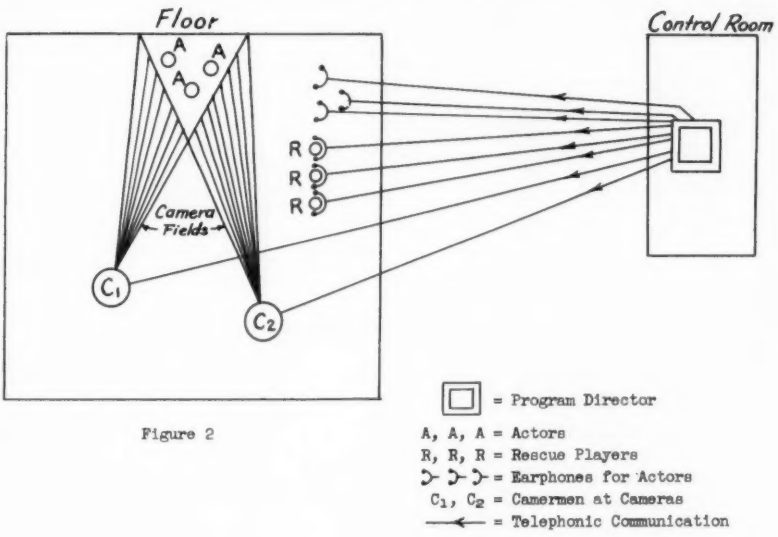

Figure 2

in which he could receive further instructions once he was on the scene of action. The director would be over-crowded with things to watch and would have a difficult time to pay sufficient attention to all aspects of the production at any one time.

Method 2. Here, the program director would continue to be the final authority over the entire production, but would give orders, telephonically, to his acting staff via an assistant director who would be located on the floor. (See Figure 3.) The assistant director would, in turn, relay these orders to the staff by means of a set of pre-arranged visual signals. The director would still be in direct telephonie communication with his camera crews, however.

SCHEMATIC REPRESENTATION OF SUGGESTED METHOD NO. 2

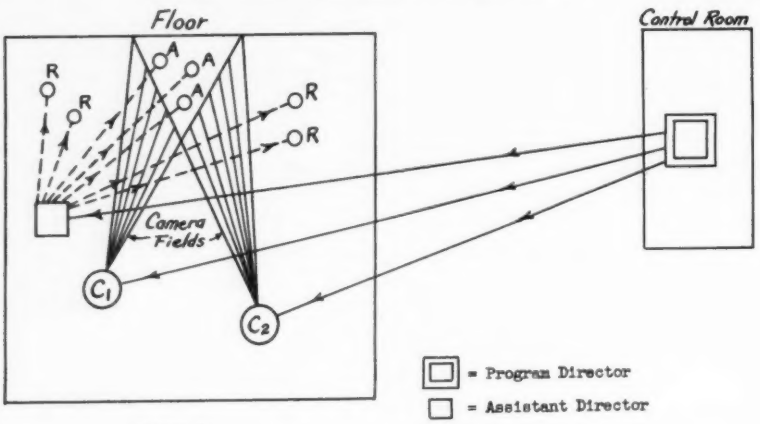

Figure 3

SCHEMATIC REPRESENTATION OF SUGGESTED METHOD NO. 3

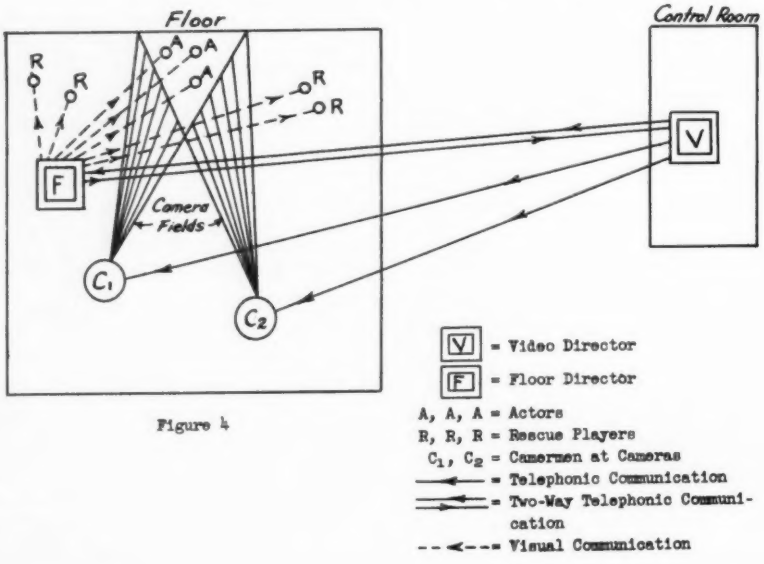

Figure 4

Method 3. Here the assistant director of Method 2 would become a full director handling all floor aspects of the broadcast and sharing authority equally with the program director, who would be mainly concerned with the video aspects. These two persons would be in two-way telephonic communication (see Figure 4) and would coöperatively determine the policies and handling of the production. The floor director would, however, still have to use visual signals to his acting staff.

Method 4. The floor director, in this case, would become the final authority, having control over both the floor and video aspects of the production and giving orders via telephone (see Figure 5) to the actors and to the video director, who would be merely an assistant.

SCHEMATIC REPRESENTATION OF SUGGESTED METHOD NO. 4

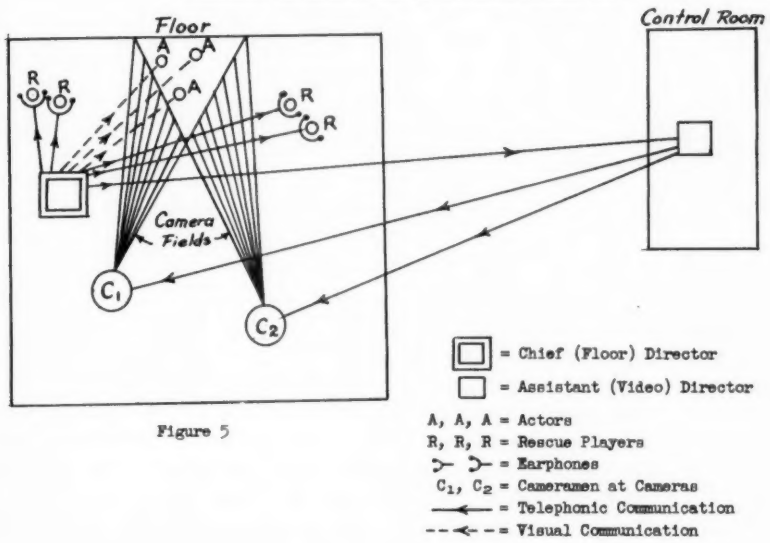

Figure 5

To clarify the operational means by which each of these four methods would function in a specific broadcast situation, and to delineate the exact interrelationships between director and director, director and assistant, and director and acting staff, is difficult to do on paper. No two broadcast situations can be exactly alike, and as it would be impossible to predict in advance the specific artistic and technical requirements necessary to achieve the desired aesthetic effect of a

particular scene or complex of scenes, the maximum flexibility of all mechanical and human agents concerned is to be desired. The important element is the fact that the spontaneous action and interaction of all aspects of the production should be as little hampered as possible. Ease of verbal and visual communication between the director in charge (or assistant director) and his acting staff is important. As new situations, or changes of situation, present themselves before the cameras, the director in charge must be able at seconds' notice to direct, stimulate, prepare and check both the actors who at present are actually performing and those who are sitting on the sidelines ready to be called as rescue-players. If Method 3 is used, the two directors involved must be able constantly to maintain a flow of conversation between them, so that each may know of the other's intentions and suggestions.

Obviously, the most important single factor which must be considered here is the problem of timing. This is comparatively simple so long as one cameraman takes orders from the director. But if more than one cameraman are employed, the more complex the problem becomes. If, in addition to this, the floor director and his staff of actors are also involved in this situation, a lag anywhere in the chain of interrelationships might disorganize the flow of production. The floor director, for example, might decide to alter the course of action going on before the cameras by sending in a rescue player in the shape of a man with a gun. Naturally, he wants this character to be photographed. The video director, in a split second prior to this, might have considered letting the particular picture currently being televised run a few seconds longer, or he might have been impressed by a previous suggestion from the floor director to photograph another character who is in the process of dying. The <u>new</u> order from the floor director--namely, to photograph the man with the gun,--throws these previous contingencies out of whatever potential consideration they may have had. The suggestions coming from the floor director, however, are themselves contingent upon the varying improvisations occurring in front of the cameras. He may have changed his mind before a certain scene got started, sending a new character upon the scene with an accompanying order to the video director, telling him to shift the camera's focus to the latter. The video director then has to transmit the floor director's order to the camera crew. All this sounds more difficult described on paper than it would be under actual broadcast conditions. Whoever has witnessed a performance in a spontaneity theatre knows that a staff can easily be trained to a high degree of efficiency along these lines.

DIRECTIONS AND AIMS IN TELEVISION RESEARCH

The researches carried out in the psychodramatic laboratories[16] have prepared the ground for similar studies which are modified by the admixture of technological devices. They have shown that the spontaneity and productivity of the individuals participating in a common situation can be tested, including the director (and social investigator).[17] They have also shown that a well-balanced and productive interaction can be enhanced by the choice of co-workers with favorable tele-relationships.[18] Last but not least, they have shown that the spontaneous interaction of individuals is trainable; that they can be stirred up--at least for the duration of the action--to a degree of rapid and adequate response to a new situation, to a degree of clear and appropriate judgment and to a degree of interpersonal balance and control far beyond the expectancy of intelligence and ability observable in these individuals in daily life.

In the psychodramatic laboratory, three types of interaction have been found, each of which conditions the other two, thus shaping the total production. The first is the interaction between technological equipment, the light and color systems--to which, in the television studio, the cameras and the microphones might be considered to correspond--and the individuals upon the stage upon whom they are focused. The psychodramatic director, watching and directing the persons on the stage, and the man who is receiving his instructions and directions as to how and when to change lighting-effects, often have collisions because of differences in timing--acceleration and retardation of a certain lighting-effect reaching the stage--and because of the different responses of the individuals on the stage to the changes in color and light thrown upon them. In

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[16]This refers to the laboratory at the Psychodramatic Institute, Beacon, N, Y., and the Theatre for Psychodrama at St. Elizabeths Hospital, Washington, D. C. The latter is described in an article by Herriott, F. and Hagan, M., "The Theatre for Psychodrama at St. Elizabeths Hospital," Sociometry, Vol. IV, No. 2, May, 1941.

[17]See Moreno, J. L., "A Frame of Reference for Testing the Social Investigator," Sociometry, Vol. III, No. 4, October, 1940.

[18]Tele has been defined as "an interpersonal experience growing out of person-to-person and person to object contacts," (see footnote 3). "The trend toward mutuality of attraction and repulsion many times surpasses chance possibility." (Ibid.)

some cases the warming-up process is stimulated; in other cases it is decreased or even blocked. It is obvious that, in the television broadcasting studio, similar responses might occur in the course of spontaneous production while the cameras are operating.

The second type of interaction is the private personal relationships which exist between the members of the staff. In the psychodramatic laboratory, dozens of occasions have been noted where sympathy and antipathy between the staff members changed from day to day--or even from one performance to another. The tele-relationship of each of these people to the director--or that of a combination of them to him--is often noted. In a television studio, tele-relationships must exist and must be considered.

The third type of interaction is that which takes place on the level of productivity, itself. It involves the members of the staff--not as private persons, but in the rôles and situations which they create, as they act on the stage. On this level, a different type of balance and imbalance has continuously been observable in the psychodramatic laboratory between the performers themselves, and between them and the director in his rôle as it refers to the particular situation. A similar type of interaction must be anticipated as taking place in a television studio between the two directors, between the floor director and his technical staff, between the video director and his cameramen, and between the cameramen and the floor director.

The first type of interaction will condition the second, the second the third, and the total production must be studied and evaluated from the three points of view here delineated. It has been our experience--and this must be particularly emphasized to every organizer of a television studio--that the more spontaneous a production is, the more these types of interaction are bound to influence the course and result of a performance.

To illustrate this process, we present, in Figures 6 and 7, sociograms which portray actual work-situations in the psychodramatic laboratory. By the replacement of "floor director" for "psychodramatic director" and "video director" for "light-operator"--actors and rescue players remaining the same for both media--a graphic presentation of the dynamic interpersonal process is provided.

Thus, it cannot be assumed that the interpersonal situation produced in a psychodramatic laboratory can automatically be introduced into a television laboratory. Several extenuating phenomena are introduced by the technological devices of television: the interaction requirements of the personnel, the

integration of the technological personnel with the production personnel, and, finally, the problem presented by the television audience. The latter's sense of appreciation is conditioned by the highly perfected film and radio conserves, or to the smooth

ARBITRARY WORK-SITUATION IN METHOD 3

Sociogram

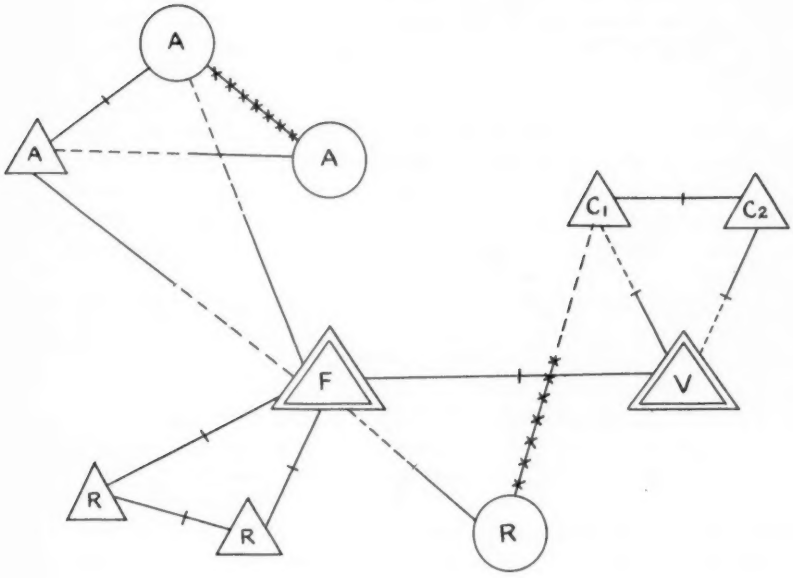

Figure 6

F = Floor Director
V = Video Director
C_1, C_2 = Cameramen
A, A, A = Actors
R, R, R = Rescue Players

△ = Male
○ = Female
——— = Attraction
✕✕✕✕✕ = Rejection
– – – – – = Indifference

production of a stage play. What they see in their receiving sets will differ greatly in form, regularity and smoothness from what they have been used to seeing heretofore. Their sense of appreciation will have to be trained along the lines of spontaneous experience and production.

The aim of television research should be to assist in a gradual evolution from the present vague and inarticulated broadcast conditions to conditions which bring the medium of

ARBITRARY-WORK SITUATION IN METHOD 3

Sociogram

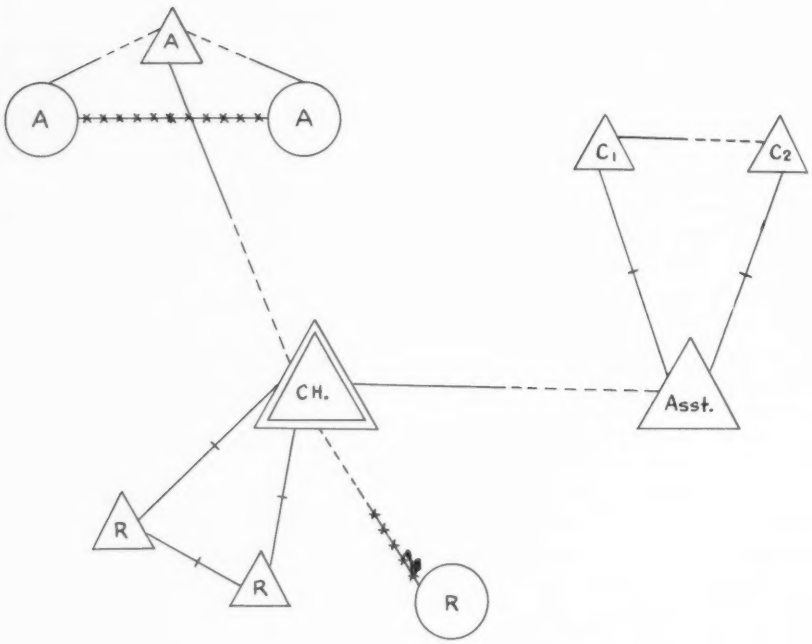

Figure 7

Ch = Chief (Floor) Director
Asst = Assistant (Video) Director
C_1, C_2 = Cameramen
A, A, A = Actors
R, R, R = Rescue Players

△ = Male
○ = Female
——— = Attraction
✕✕✕✕✕ = Rejection
– – – – – = Indifference

television to its most suitable spontaneous expression. It is obvious that no broadcasting company can make changes overnight. Every innovation must be tested and evaluated in the objectivity of the laboratory before audience presentation can be allowed. The direction of research should be towards the

increase of the spontaneous flexibility of each of the agents responsible for the production.

The range of television research must consider the following factors: (a) the director and his associates, (b) the production,--technical and creative--and (c) the audience.

The omissions and irrelevancies of a superficial approach toward televising a spontaneous production will be the more apparent the more integrated and correlated such a production becomes. If a television director attempts to photograph a group of people dancing--for example--he may, with more or less justification, move his cameras from one part of the floor to another, leaving certain of the dancers out of the picture entirely. His only concern is that of securing a picture of the dance which pleases the eye. This kind of hit-or-miss procedure, entirely dependent as it is on the momentary taste of the director, is what is bound to occur in television broadcasting unless care is observed. Even if a director has a highly developed aesthetic sense and turns in a tolerable broadcast effect, five different directors might turn in as many different versions of the same broadcast. It seems to us, therefore, that a system of testing potential television directors should be devised in order to secure the most desirable and coöperative results possible.

Two frames of reference for such a test are necessary. One of them should consist of a body of experts in the field of television who would act as a selective jury, passing judgment upon the relative aesthetic merits of the potential directors to be tested. Suggested criteria for the use of the jury are as follows:

(a) Comparative richness and variety of units aesthetic to the optic sense as caused to be broadcast by the director;

(b) Originality in the selection of these units, and

(c) Efficiency in the use of the time at the disposal of each particular broadcast.

In this connection it should be added that all directors in one particular group to be tested should be given as nearly the same type of material to work with as possible. The other frame of reference should consist of the reaction of the television audience itself to various programs conducted by the respective directors under consideration. A poll of the audience could be taken in the form of a written questionnaire asking each member of the audience which of a number of programs he liked best and for what reasons. A director to be tested would be assigned to each program and his popular merit

could be determined by what his television audience thought of the broadcast he directed. The discovery would probably be made that certain directors were unusually adept at one type of program while at the same time undesirable for another type.

If two directors are working together on the same production, as in Method 3, they should be tested for their ability to coöperate to the fullest possible extent. As we have already stated, the element of split-second timing is most important, and the interplay of suggestions between the floor and video directors should not be hampered by friction caused by difference in personality or other maladjustments in their interpersonal relationships. There should be at all times a productive relationship between them.

The acting staff which forms the nucleus and basis for all spontaneous television productions as envisioned by us should be subjected to a rigorous system of training along much the same lines as those established in the psychodramatic laboratories.[16] Before the training is specifically applied to the medium of television, each actor should be well grounded in the principles of spontaneous dramatic action and should know the full significance of the meaning of spontaneity applied to this field. He is then ready for testing and training before the cameras.

It is suggested that this training should comprise the actor's being placed in very simple dramatic situations to start with, situations in which a maximum of three persons are involved and which last for relatively short periods of time--five to ten minutes. There should be no attempt to complicate the plots of these situations with elaborate sophisticated by-play; the action should be carried out along simple and fundamental lines. As the actor becomes more and more proficient at his work, the complexity of the situations in which he acts and their duration can be gradually increased. It should also be pointed out that there should be established a laboratory in connection with the television studio where all phases and ideas for a production can be experimented with before the production is actually broadcast, so that the directors and producers can determine which elements are best suited for production and which elements should be deleted.

The most difficult problem which presents itself to the whole subject of adapting spontaneity methods to television devices is that of adjusting and educating the audience to the appreciation of spontaneous material. As has been stated frequently in this article, mankind through the ages has grown to look upon the cultural conserve with its implications of perfection as the sine qua non of human endeavor. We have nowhere

meant to imply that the conserve is an undesirable quality in civilized culture. On the other hand, it seems evident that through his unflagging concentration on the "finished article," man has consistently neglected another vital property of his existence, the element of spontaneous creativity per se. That an audience can exhibit an enthusiastic appreciation of a spontaneous performance has been demonstrated to us time and time again in the psychodramatic theatre and elsewhere. Once the spectators are informed of what to expect, they can be persuaded to readjust their standards of appreciation to comply with the artistic principles of a spontaneity production.[19]

The television audience may be educated along spontaneity lines in the following ways:

1. Polls can be sent out by the broadcasting stations to members of the audiences inviting criticism and suggestions concerning various programs;

2. Lectures can be televised at various intervals, explaining various aspects of spontaneity work and the basic principles underlying it; and

3. Members of the television audience can be invited to take active part in selected spontaneity productions.

CONCLUSION

Social scientists have often been accused of a fatal inability to counter new technical inventions with social inventions which would halt the growing curtailment of their mastery and control in the human domain. As long as technological conserves determine and control the actual moments of action, it is clear that man's own actions and productions must become functions of these devices and be more or less determined by the cold logic of their mechanism.

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[19]During the next two or three years it is unlikely that television will begin to assume the gigantic commercial aspects exhibited by the radio networks at the present time. Equipment for the necessary expansion of broadcasting and receiving facilities will not be forthcoming, due to wartime priorities, and trained technicians will be at a premium. It therefore seems obvious that any activity in the television field must perforce remain on an experimental level for the duration of the war. Television should accordingly take advantage of this freedom from commercial pressure to carry out experimental and investigative measures aimed at placing a pleasing and artistic product before the public. It has the chance to escape Topsy's misfortune of "just growing."

Sociometry, basing its efforts on an analysis of actual events and their measurability and predictability, has, by the use of its own tools, moved closer and closer to the actual moments of action and thus become able to reverse the relationship, making man and the social group the decisive and determining factors, and the technological devices their function. Some of the most significant examples of this development are: the analysis of the book as a technological conserve when confronted by the immediate presence and productivity of the spontaneous individual;[20] the testing and training of the spontaneity of individuals so that they become able to master vocational and work situations of every kind on the spur of the moment;[21] the testing and training of individuals, fitting them for situations which might face them unexpectedly, such as, for instance, situations produced by psychological and physical warfare;[22] and--last but not least--the warming-up of the members of an entire community by sociometric testing so that they can face the realities of the social structure of their community--at the moment of testing.[23]

Viewed against this background, this paper is another effort in the direction of showing how a technological medium --television, which is bound to become one of the most powerful means of shaping the public mind--can be brought into its proper place in the service of man as a spontaneous and creative agent.

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[20]See Moreno, J. L., "Die Gottheit als Autor," (The Godhead as Author), Berlin, 1918.

[21]See Moreno, J. L., "Who Shall Survive?"

[22]See Moreno, J. L., "The Advantages of the Sociometric Approach to Problems of National Defense," and references contained therein, Sociometry, Vol. IV, November, 1941.

[23]See Moreno, J. L., "Who Shall Survive?" and "Foundations of Sociometry: An Introduction," Sociometry, Vol. IV, No. 1, February, 1941.

THE STATISTICAL ANALYSIS OF REASONS AS RESEARCH OPERATION

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Columbia University

THE PROBLEM

This paper deals with the type of study in which statements such as the following are made. (These statements are taken from published sources.)

> Of 1000 boys who left school prematurely, 3.3 left because they could not keep up in class.
>
> Of 1042 students interviewed in the library, 470 were there to do assigned reading.
>
> Of 5310 people who did not vote on Election Day, 15.4 did not vote because of physical reasons, i.e., illness or absence from the city.
>
> Of 397 cases of bankruptcy in retail business, 2.02 were due to the personal characteristics of the businessman.

It will be seen that in each of the above cases a number of people who have done something (left school, read a book, or formed a political opinion) have been asked their reasons and the results have been stated in statistical form. Usually such studies contain whole lists of reasons with the corresponding frequency figures. In order to point up our problem we have taken one line from each study.

A student intent on a specific field may not meet this kind of statement very frequently. It is not difficult, however, to collect numerous examples, by crossing department lines in search of subject matter. Studies of non-voting, of crime, accidents, bankruptcy, buying habits, have been published, containing such lists of what shall hereafter be called reason frequencies. The rule seems to be that where studies are made either to foster desirable or to curtail undesirable activities, lists of reason frequencies will be near at hand.

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*Read at the summer meeting of the Social Research Association, Chicago, Illinois, 1941.

In many quarters this type of investigation has fallen into disrepute. Aside from incidental disparaging remarks, however, nowhere has a systematic statement been made on why such data should not be considered valid scientific material. On the other hand, if they were valid, they should be, of course, of very great importance. As a matter of fact, in a loose way, they might be considered the ideal substitute for controlled experiments which are so difficult to make in the social sciences. Life itself consists of a stream of stimuli exercised upon groups of individuals with varying characteristics. If, by retrospection, it were possible to reconstruct the situation in which these stimuli were exercised, we would have information equivalent to an unlimited number of social experiments.

It therefore seems advisable to scrutinize more carefully the type of studies exemplified by the above statements. This paper does not attempt to come to any final conclusion. Its purpose is to bring into the open the type of specific judgments, studies, and assumptions which have to be made before any final decision can be arrived at concerning whether or not a statistical analysis of reasons is valuable scientific material.

DISCERNING AND THE CORRESPONDING FOURFOLD TABLE

To begin our discussion with a very simple case, let us assume that the names appearing on the list of registered voters in a single community have been divided into two groups by a random procedure, so that no single characteristic will give any individual a greater chance of belonging to one group rather than to the other. Then an urgent letter is sent to one of these two groups, stressing that it is the duty of the addressee as a citizen to vote, and that he should certainly go to the polls. Let us suppose that this community has n registered voters, and that a of them actually did vote. After election day, we interview these a voters in order to find out whether our letter played any rôle in getting them to the polls. Suppose that after these inquiries have been made, we find b voters about whom we have the feeling that they voted "because" we sent them our letter. (They will hereafter be called "b-cases.") The proportion b/a is obviously the kind of reason frequency which we want to discuss.

The first question the reader will ask is how it is possible to tell whether a person voted because of a letter which had been sent to him. There is, however, another problem which must first be answered and the importance of which is frequently overlooked; what is the meaning of the ratio $\underline{b}/\underline{a}$? What do we really want to express when we state that, say 20 percent of the voters voted because of our mail campaign? We shall postpone answering the question of how a reason is established in a single case, in order first to see what a reason frequency means under the assumption that our individual judgment was valid.

Let us go back to the experiment and assume that the community consisted of $\underline{n}$ = 2000 people: one thousand were exposed to the mail campaign and 1000 were not. Table 1 tells how many voted and how many did not.

Table 1

RELATIONSHIP BETWEEN EXPOSURE AND EFFECT IN AN HYPOTHETICAL CONTROLLED EXPERIMENT

	Voted	Did not Vote	Total
Letter was sent	700	300	1000
Letter was not sent	500	500	1000
Total	1200	800	2000

It can be seen that in the exposed part of the sample there were 200 more voters compared with the unexposed part of the sample, and if the experiment were properly controlled, then the excess of 200 voters in the exposed group would be attributed to the effect of the letter.

Again we shall say that these 200 people voted because they received the letter, and we speak of these 200 $\underline{b}$-cases. But here the notion is well defined by an objective operation, and therefore its meaning does not introduce any difficulty.

From the present definition we can say only that there were 200 $\underline{b}$-cases: we cannot say whether it was Mrs. Smith or Mrs. Jones, or anyone else on the list of registered voters who belongs in this group. Here is where the reason frequency, introduced above, comes in again. We can carry through careful interviews with the 1200 people who went to the polls and

try to discern whether the letter played a rôle or not. This is how we previously arrived at the individual b-cases, on which our reason frequency was based. If our discerning was performed properly, then in this specific experiment we should discern 200 voters who were influenced by our letter.

Proper understanding of a reason frequency can now be approached. We have a number of actors--a. We construct, at least hypothetically, a corresponding fourfold table (hereafter called an Fft). This is a table patterned after the scheme of a controlled experiment. The actors go into the first column. The distinction between those who have been exposed to the stimulus and those who have not been exposed is determined by the specific reason we want to test. We then discern among the actors the number of b-cases which we consider to have been influenced by this specific procedure. Our discerning has been properly performed only if the number of b-cases which are arrived at by direct interview of the actors is the same as the number arrived at by numerical treatment of the corresponding Fft. The reason frequency is the proportion of b-cases among all the actors.

The term exposure, which was easy to understand in the foregoing examples, will often have to be used in a more general sense than is customary. Suppose we want to apply our controlled experiment scheme not to some external influence, but to what is usually called a subjective factor. For example, suppose we want to know whether one kind of attitude is more conducive to efficient work than another. We must then assume hypothetically that it is possible to expose people at random to the attitude being investigated--for instance, by giving the subjects some sort of drug which would create this attitude. In this sense we will then speak of an Fft in which people are divided into those who have been exposed, and those who have not been exposed to a certain emotion, attitude, purpose, etc. In such a study, the b-cases will represent those individuals who acted because they were jealous, or because they wanted something, etc. It is particularly important to see clearly the distinction between a person having been exposed to (having) a certain attitude, and acting because of it. Schematically speaking, a murderer might have been jealous of his victim, but a case study might come to the conclusion that he killed him for quite another reason. The word, "motive," is very often used in an ambiguous sense, sometimes indicating a man's attitude, and sometimes indicating an attitude which has been discerned as the reason for an action. The discussion between Professors MacIver and Lundberg on the question of

motivation research is very much obscured by an insufficient distinction between these two meanings of the term.

Summarizing our discussion so far: A reason frequency is the result of a specific operation which consists in discerning the rôle of an actual exposure upon a subsequent action in a number of cases; the meaning of the numerical value of a reason frequency is contingent upon the existence of a "corresponding Fft." It is this latter point which will now have to be formulated somewhat more precisely.

REASON FREQUENCY AND IMPACT

We set up a controlled experiment in somewhat general terms, by speaking about exposed, not exposed, acting and not acting people. The Fft which will result is presented in Table 2.

Table 2[(a)]

	Acting	Not Acting	Total
Exposed	s	t	e
Not exposed	v	w	$\bar{e}$
Total	a	$\bar{a}$	n

[(a)] We indicate the number of exposed and acting people by e and a respectively, and the number of not exposed and not acting people by $\bar{e}$ and $\bar{a}$.

Many indices have been introduced for the measurement of association between exposure and action in such a Fft, but they all boil down to what is called the determinant of the Fft, to wit:

$$\begin{vmatrix} s & t \\ v & w \end{vmatrix} = sw - tv = \Delta$$

The computation of X^2, for example, is based on the difference between what is called the actual value and the chance value in each cell of the table, to be computed as $d = s - \left(\frac{ae}{n}\right)$. The

same value can also be computed by the formula

$$d = \frac{\Delta}{n}$$

X^2 itself can be related to Δ by the formula

$$X^2 = \frac{\Delta^2 n}{e\bar{e}a\bar{a}}$$

The "point correlation" which corresponds most nearly to the conventional Pearson r is computed by the formula

$$r = \frac{\Delta}{\sqrt{e\bar{e}a\bar{a}}}$$

(The tetrachoric r is usually determined graphically through charts published by Mr. Thurstone. In these same charts, a graphic interpretation of the relationship between Δ and the tetrachoric r can be given.)

For our present purpose, we shall use primarily three further measures of association between exposure and action, which are as simple as those used more commonly, and which also go back to Δ.

It will be remembered that we called b the excess of actors when exposed and unexposed people were compared. A simple computation shows that the number of b-cases is

$$b = \frac{\Delta}{\bar{e}}$$

b, like d, represent absolute figures, and therefore depend upon the size of the sample. There are two useful indices which can be derived, according to whether we relate b to the number of exposed people or to the number of actors. In the first case, we get what might be called the effectiveness of exposure

$$F = \frac{b}{e} = \frac{\Delta}{e\bar{e}} \quad 1/$$

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[1] The computation is very simple. The proportion of acting people in the exposed groups is $\frac{s}{e}$. The corresponding proportion in the unexposed group is $\frac{v}{\bar{e}}$. The difference in proportion is

$$\frac{s}{e} - \frac{v}{\bar{e}} = \frac{s\bar{e} - ve}{e\bar{e}} = \frac{s(v + w) - v(s + t)}{e\bar{e}} = \frac{\Delta}{e\bar{e}}$$

This index measures the proportion of exposed people who acted "because of exposure" and is independent of how many people were exposed. Going back to the example of the mail campaign, it will be recalled that we found 200 b-cases, and therefore F = .20. If we had doubled the number of exposed cases but left the internal structure of the table unchanged, we would deal with the following table.

Table 3

	Acting	Not Acting	Total
Exposed	1400	600	2000
Not exposed	500	500	1000
Total	1900	1100	3000

In this table, f again would be .20, as can be found by both methods of computation.

$$\frac{1400}{2000} - \frac{500}{1000} = \frac{(1400 \times 500 - 600 \times 500)}{2000 \times 1000} = .20$$

This is the reason the index, F, is a good measure of what we seem to be driving at when we speak of the effect of an exposure. We obviously think of changes brought about if people are exposed, and therefore the extent of exposure should not change such a measure of effectiveness.

But we can also relate b to the number of actors, and thus get another index.

$$C = \frac{b}{a} = \frac{\Delta}{\bar{e}a}$$

This index we shall call the impact of our exposure. Whereas F measures the proportion of b-cases among the exposed people, C measures the number of b-cases among the actors. The impact is not independent of the extent of exposure. In our mail coverage example (Table 1) the impact would be

$$C = \frac{200}{1200} = .17$$

In Table 3, where we had doubled the number of exposed cases, we would get

$$C = \frac{400}{1900} = .21$$

In the second case, the impact is larger because this measure depends upon the extent of exposure. Thus two factors can have the same impact, but in the one case the impact may be the result of greater exposure and less effectiveness, whereas in the other case it may be the result of greater effectiveness and less exposure.

Between impact and effectiveness there exists the relation

$$C = \frac{e.F}{a}$$

Thus for a given number of actors impact is the product of extent and effectiveness of an exposure.[2]

In many cases it is the impact rather than the effectiveness of exposure which we are interested in, for example, if we want to measure the value of a political speech: we are equally satisfied if few people listened to it, but its impact was great because these few were greatly influenced; or if it had such a large audience that it was important in spite of having influenced only a small proportion of those who listened to it.

We can now reformulate the results of the previous

[2]The concept of impact is similar to the notion of impulse in mechanics, which is the product of mass and speed of a body: a small body in swift motion can stop a large body in slow motion, and vice versa.

Two further observations might be of interest to the more statistically-minded reader.

1. The impact can also be expressed as

$$C = \frac{\Delta}{\Delta \max}$$

which means it is equivalent to Δ measured relative to the maximum value Δ can assume for a given marginal distribution of exposed and acting people.

2. All these formulas can also be applied to fourfold tables where no difference between exposure and action can be shown, e.g., the correlation between sex and whether a person is above or below 40 years of age. Then F and C can assume two values:

$$F_{ea} = \frac{\Delta}{e.\bar{e}}; \quad F_{ae} = \frac{\Delta}{a.\bar{a}}; \quad C_{ea} = \frac{\Delta}{\bar{e}.a}; \quad C_{ae} = \frac{\Delta}{\bar{a}.e}$$

In such cases the point correlation r satisfies the formula

$$r^2 = F_{ea} \cdot F_{ae'} = C_{ea} \cdot C_{ae}$$

section in a very simple way: a reason frequency established by discerning the rôle of a factor in comparable actions performed by a given number of actors is identical with the impact of the exposure to this factor derived from a corresponding Fft.

It should help to appraise the value and the limitations of the notion of impact (and therewith the meaning of a reason frequency) to raise this question: If, by means of an appropriate study, we should find out that 20 percent of a group of actors behaved because of a certain reason, x, what do we know, then, in regard to the corresponding Fft? Obviously the two Fft's given below, and numerous others, would be consistent with C = .2.

Table 4a

	Acting	Not Acting	Total
Exposed	80	70	150
Not exposed	20	30	50
Total	100	100	200

Table 4b

	Acting	Not Acting	Total
Exposed	40	10	50
Not exposed	60	90	150
Total	100	100	200

The association between exposure and action is much greater in Table 4b than in Table 4a. (The effectiveness, F, is .13 for the first, and .4 for the second table.) But the impact of the factor, x, in the two cases is the same: the lower effectiveness in the first table is compensated for by its greater coverage.

PROBLEMS OF DISCERNING

We must now take up the operation of discerning, which was taken for granted in the preceding text. First, it is useful to stress what discerning is not. It is not answering

the question of why a person acted the way he did. As a matter of fact, only with the help of a number of additional assumptions can meaning be given to such a question, and this paper is not intended to go that far. In discerning, we answer a much more modest question: Can a certain factor to which an acting person was exposed be considered a reason for his action? For the present, it will be sufficient to illustrate with the example in Table 1, where a part of the registered voters in a community were exposed to a mail campaign.

The appeal to vote was successful with some voters and unsuccessful with others. Let us call $\underline{x}$ the complex of characteristics which would make the addressees possessing them susceptible to the letter's appeal. The sample can then be divided into two parts: those who possess the characteristic, $\underline{x}$, and those who do not. It is important to realize that the proportion of people with the characteristic, $\underline{x}$, is equal for those who did receive the letter and those who did not; it is inherent in the nature of a controlled experiment that each characteristic occurs with equal frequency among exposed people and unexposed people. This condition being met, Table 1 can be decomposed into two tables pertaining to the susceptible and to the unsusceptible parts of our sample. The decomposition would take the following form:

TOTAL GROUP					Have Characteristic $\underline{x}$					Do Not Have Characteristic $\underline{x}$		
	a	$\bar{a}$	Total			a	$\bar{a}$	Total			a	$\bar{a}$	Total
e	700	300	1000	=	e	200	0	200	+	e	500	300	800
$\bar{e}$	500	500	1000		$\bar{e}$	0	200	200		$\bar{e}$	500	300	800
Total	1200	800	2000		Total	200	200	400		Total	1000	600	1600

The reader will see that by adding box by box of the partial table, we get the original Table 4.[3] For susceptible people,

[3]Such a decomposition is done very simply by keeping in mind that the proportion of exposed and unexposed people has to be the same in the susceptible group, the unsusceptible group, and the total sample. The only other piece of information needed, then, is the number (ℓ) of susceptible people, which can be computed by the formula,

$$\ell = \frac{\Delta}{e.\bar{e}} \cdot n.$$ Such a decomposition of a given Fft can be carried through only in one way.

the exposure we created is a necessary and sufficient condition for their going to the polls. The people possessing the characteristic, x, vote if they receive the letter, and if they do not receive it they do not vote. In regard to the other people, there is no association between receiving our letter and their voting. Obviously the operation of discerning consists in picking out the exposed people who possessed that characteristic at the time of their exposure, or who were in such a situation that they would vote and vote only if they received the letter. Or, to put it differently: to discern whether a certain exposure was the reason for a subsequent action means to judge whether or not the action would have come about without this exposure having been present.

It is obvious that from the present state of our knowledge such a judgment can be made only very crudely, and with a great degree of uncertainty. It implies that we are able to make two kinds of psychological judgments. We have to describe the psychological state of an individual at a given moment, in great detail, with the help of a number of variables. And we have to imply that psychological laws can be applied to all these variables by saying, for example, that if an individual is in a certain state of mind, has a certain amount of experience, etc., and in this sort of situation a piece of propaganda is not brought to his attention, or if he does not have a certain other kind of experience, the result will be that he will not (or nevertheless will) perform the action being investigated. The process of discerning is thus nothing but a prediction applied retrospectively. In a prediction an attempt is made to describe an individual at the present moment, and to ascertain whether he will do something in the future. In discerning, we describe the individual at a past moment, and from that point try to predict what he was then likely to do in what was then the future. That this future has by now become past is irrelevant for the logic of the procedure.[4]

Although discerning and predicting are logically of the same character, they are very different in ways of verification. If, on the basis of data given now, a prediction is made about

[4] It is worthwhile to point out that this operation of discerning is almost identical with some of the things Max Weber has written on the problem of historical causes. Even the brief summary given by Parsons, in his "Structure of Social Action," shows that Weber's analysis comes down to the setting up and utilization of fourfold tables; and, incidentally, his whole point of view becomes much clearer if it is put in such terms.

a future happening, it is possible to wait to see whether this prediction will come true. But if the claim is made that an action which has already been performed could have been predicted from a preceding set of data, it would really be necesary to re-create this preceding stage and then to see whether the action actually did come about. The latter procedure is obviously not feasible, and therefore the discerning of a factor as a reason in a single case can actually not be verified directly. Only indirectly, by means of statistical procedures, can a statement about reasons be verified.

The general idea of such verification is simple and can be derived from the discussion so far. If the corresponding Fft is actually available for a number of actions, it is then possible to see whether the proportion of actors who are discerned to have behaved because of exposure, and the impact computed from the Fft, lead to the same result. A concrete example of such a test, not beyond the realm of practicability would come from certain practices in the field of advertising. Certain big advertisers, who want to pretest an advertising campaign, select two comparable cities, put the campaign on in one city but not in the other. Then they observe the sales of their product to see whether they increase in the city whose inhabitants have been exposed to the campaign. In a characteristic example reported by Frank Stanton[5] it was found, for example, that for every 100 purchases in the market not covered by the campaign, 188 purchases were made in the experimental market. (This corresponds roughly to an impact of C = .3.) If the buyers of the product in the experimental market had been interviewed, 88 out of 188 buyers would have had to be found for whom a competent psychologist would say that they would not have bought the product if they had not listened to the radio program advertising it. Such an agreement between number of discerned cases and the statistical result of comparison between the experimental and control markets would constitute a verification of the operation of discerning in this particular case.

This sort of systematic test has not yet been made, as far as our knowledge goes. This writer, however, upon various occasions has tried to obtain evidence which approaches this test, and in three studies has found promising results. In one study, two samples of people in the same city, with rather homogeneous social status, were available. In both samples it was

[5]Stanton, Frank. A two-way check on the sales influence of a specific radio program. J. Ap. Psychol., XXIV, No. 6, December 1940, pp. 665-672.

known whether the respondents did or did not use a certain product, and whether they listened to the radio program advertising this product. For one sample, the correlation between listening and use of the product was .3, and for the other, it was .1. In both samples the users of the product were interviewed in detail concerning how they had come to use it, and in the first group the program was discerned as a cause for 23 percent of the total, whereas for the second group only 15 percent were thus discerned. Here, then, at least in a general way, the Fft verified the cumulative result of the individual discerning procedures.[6]

In another study, farmers who owned radios and farmers who did not own radios were asked about certain of their habits: how often they attended church, how late they usually went to bed, and so on. By cross analysis, spurious factors such as economic status, age, and size of family, were eliminated, so that the rôle of radio ownership in its relation to these habits came out as clearly as can be expected in this type of statistical study. At the same time, the people who owned radios were asked whether they felt that the radio had influenced their habits in regard to church attendance, daily time schedule, etc. Here again the cumulative results of the individual interviews matched well the partial correlations which were based essentially on the analysis of fourfold tables.[7]

Finally, in a study of department store buying, women were classified according to how close they lived to the department store in question and how critical they were toward it. Fft's were derived on the basis of this information and whether they patronized the store or did not patronize it. At the same time, the women who did not buy there were asked their reasons for not buying. The impact derived from the Fft correlating residence and buying was C = .38, whereas the proportion of non-buyers who gave inconvenient location as reason was $\frac{b}{a} = .40$.[8]

Although these tests are rather comforting, they cannot be really conclusive as long as they are made incidental to

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[6]For a discussion of this study, see Elias Smith and Edward Al Suchman, Do People Know Why They Buy? J. Ap. Psychol., XXIV, No. 6, December 1940, pp. 673-684.

[7]See Robinson, W. S., Radio Comes to the Farmer. Radio Research, 1941, New York: Duell, Sloan and Pearce, 1941.

[8]Lazarsfeld, Paul F., Evaluating the effectiveness of advertising by direct interviews, J. Cons. Psychol., Vol. 5, No. 4, pp. 170-178. July-August, 1941.

a study, rather than being the result of systematic experimental design. Nothing can be said finally concerning the usefulness of statistical analysis of reasons without the validity of discerning having been tested under varying conditions.

At the beginning of this paper, it was mentioned that the number of studies containing more or less careful reason statistics is rather large. Unfortunately, however, these studies never make explicit the process of discerning. The author says that after careful reading of the cases by several people, such-and-such a factor was singled out as a cause.[9] What is needed, however, is precisely a very careful description of how this decision was made, in order to learn what variables were assumed to characterize the case, what laws were applied to make forecasts of a later state of affairs, how safe the prediction was, what alternative possibilities were considered, what assumptions were made about other kinds of exposure prevalent in this group, etc. It is the conviction of this writer that if such an analysis were more frequently carried through, much systematic knowledge about discerning would quickly accumulate. It would then be possible, for example, to classify factors into different groups according to degree of discernibility, to bring out more clearly the difference between impact and effectiveness always underlying such studies.

It is sometimes not quite easy for the analyst clearly to formulate his grounds for making his discerning decision. A good technique of self-clarification is to have two people who disagree on a case discuss the matter in detail so that in the end the decision can be reconstructed as clearly as possible. At the moment, this writer has a number of pertinent studies going on, and it is hoped that in a subsequent paper the intertwining of psychology and logic in actual discerning operations will be reported more systematically. The present paper is devoted mainly to the logical side of the problem and no further comments will be made on the psychological problems.[10] As

[9] A notable exception, for its appendix on discerning, is to be found in Komorovsky, M., The Unemployed Man and His Family, New York, 1941.

[10] Even in this very elementary stage, a careful logical analysis of the operation of discerning helps greatly in training research workers in what might be called the "art of asking why." Many case studies suffer from insufficiency of data on decisive points. The case worker should be trained to ask himself at each point: "What more do I need to know here in order to predict what would have happened?" To be more concrete, we quote here from an instruction sheet worked out for the interviewers on a study:

far as the statistical results of discerning go, there might be a compensating element in the possible errors which would explain why the preliminary tests reported above turned out to be so successful.

Keeping in mind how discerning is verified, there are obviously two dangers. We can either discern more b-cases than would be warranted by the corresponding Fft, or we can discern too few. We get too few cases, colloquially speaking, if the effect of exposure is adulterated by subsequent factors contingent upon exposure. Suppose, for instance, that in a corresponding Fft for a controlled experiment we find a rather high correlation between listening to Roosevelt's speeches and subsequent approval of his position on a certain issue. Upon further statistical analysis we can explain this correlation by the fact that listening to Roosevelt makes people read the newspapers more carefully the next day, and it is ultimately the more detailed information on events which brings about approval of the president's point of view. Very likely it may be that people who afterwards are asked why they approved of Roosevelt's position would answer, "because of reading in the newspapers how things were going in Europe." Those respondents, however, who read the newspapers more carefully because of Roosevelt's speech would not have been recorded as influenced by his speech if the interview had not carefully traced back the reasons for reading the newspapers.

On the other hand, we might overestimate the weight of a factor by discerning in cases such as the following: The same controlled experiment between Roosevelt's speech and adherents to his point of view might have shown no correlation.

(footnote cont'd.)

A friend comes to visit me late at night, and when asked why he has come, he answers, because he "feels lonely." Putting ourselves in his situation at home when he felt lonely, we see immediately that from that point we could not have predicted his visit to me if we did not have any further information of this sort: Does he have other friends as well? If so, why is the visit to me more suited to a feeling of loneliness than a visit to someone else? What is it in his personality or in the quality of his feeling of loneliness which makes him want to see a friend rather than go to a movie or get drunk? It should be observed that we do not want to know how these things developed biographically. We need merely additional information at the time of his loneliness to "understand" or to have predicted for this phase of the development, that in the end he would come to visit me.

Quite a number of people, however, may say that they approve of him because they heard him speak. The actual facts might be that they just happened to hear about the event through Roosevelt's speech. However, those who happened not to hear him learned about the same event in the newspaper the next day, and turned to the same point of view merely on the strength of events. This makes the task of the interviewer obvious: to be quite sure whether an alleged influence did not just beat other influences to the punch--other influences which would have come into play if the alleged influence had by chance been passed by. It must be left to later research to find out whether such mistakes in discerning can be attributed to accident, in the sense that overestimates and underestimates of b-cases might compensate for each other. The much-discussed "rationalization" of motives implies the idea that the impact of certain kinds of exposure tends to be underestimated and overestimated respectively in the course of retrospective interviews. To our knowledge, however, this has never been empirically demonstrated against a background of really adequate interviews.

PRACTICAL APPLICATIONS

Reason frequencies will be practically useful if in a study we can only get hold of actors, i.e., of the first column of a Fft. The following types of studies are frequent.

1) Something is known about F, the effectiveness of exposure. This will be roughly the case if we study "exposure to a purpose." Suppose for example we find people who read a newspaper regularly but never listen to radio news. We suspect that they have special interests which are satisfied by the financial page or the society column of the newspaper and for which there is no equivalent in the radio broadcast. The corresponding Fft would result from a controlled experiment in which part of the sample would at random be imbued with (exposed to) such an interest and the effect of such exposure upon whether they do read newspapers exclusively would be observed. It may be roughly assumed that "who wants does," that is to say, that the Fft would take the following form:

	Act	Do Not Act	
Exposed	e	O	e
Not exposed	a - e	$\bar{a}$	$\bar{e}$
	a	$\bar{a}$	

This set-up indicates that exposure is a sufficient but not a necessary condition of action.

Then the impact is $C = \frac{e.\bar{a}}{\bar{e}.a}$. If we find the impact (the reason frequency) and the number of actors from our field study, we can derive e, the number of people "exposed" to the interest under investigation. To put it less pompously, but also less precisely, by conducting careful interviews on what special interests cause some people to read newspapers only, we get reason frequencies which roughly measure how frequently such interests occur in a given community.

2) Something is known about e, the frequency of exposure. This will be most frequently the case if we study the effect of "complete coverage." As an example we have in mind a study on non-voting and assume that it rained on Election Day. The following morning we interview the non-voters and establish that C% did not vote because of the rain. The actors here are the non-voters, and the corresponding Fft visualizes the same day in this same city, minus the rain; thus $e = \bar{e} = n$. If we know further that s people did not vote, we have the following fourfold table:

	Act	Did Not Act	
Exposed	s	n - s	n
Not exposed	x	n - x	n
	a	$\bar{a}$	

Here x is the number of people who would not have voted even if it had not rained on this day. But $\frac{s - x}{s}$ is equivalent to the proportion of non-voters about whom we have discovered by direct interview that they had not voted because of the rain. This permits us to reconstruct completely the corresponding Fft measuring the effect of rain on non-voting in a hypothetical controlled experiment in this city.

A similar logical constellation exists whenever we want to study what attribute of an object makes people choose it. The proportion of people who choose it because it has a certain characteristic gives us the impact in a corresponding Fft which derives from this hypothetical situation: if we had exposed the same people to the same object minus this characteristic how many would have chosen it? In all these cases the exposure covers the whole sample and the reason frequencies give us the effectiveness of the different elements of an object or a situation.

3) Finally, there are statistical studies which yield correlations whose meaning can be evaluated only by the operation of discerning and the resulting reason statistics. A characteristic example can be found in the field of criminology. Cyril Burt[11] has compared delinquent and non-delinquent youngsters in terms of the occurrence in their biographies of certain factors. He finds, for instance, that bad companions are much more frequently to be found among the delinquent young people. This, however, may be a spurious correlation, because bad companions and crime are both more frequent in poor neighborhoods. By scrutinizing the case histories of the delinquent boys alone, he comes to the conclusion that bad companions are only infrequently a major factor in the committing of crime. In other words, he finds that the number of b-cases found by discerning is much smaller than the number of b-cases found by applying a statistical technique to a fourfold table which is not the result of a controlled experiment. Very often when we cannot go beyond crude correlation tables, "reason statistics" will be a valuable corrective and guide to further, more careful, statistical cross analyses.

The interesting question can be raised which of the two possible techniques will make swifter progress: Will we first have social statistics so well developed that we can approximate controlled experiments by ever-refined cross tabulations? --Or will we first develop discerning techniques to so refined a point that we can infer corresponding fourfold tables from reason statistics? Certainly a clear understanding of the relationship between the two approaches should help along both lines.

We have restricted our discussion to the analysis of single reason frequencies resulting from the question whether or not a certain factor "played a rôle": in a group of actions. If our analysis is acceptable then step-by-step we can solve a number of further problems. In order of complexity, these are: what happens if in a given case we cannot make up our mind as to whether a factor did or did not "play a rôle"; what does it mean not to study merely one factor, but to look for the dominant one in a group of factors such as radio, newspapers, etc.; how do we then handle cases where we feel impelled to accept "two influences"; what does the list of reasons mean which we find in conventional reason statistics; what is meant when we say that not one but another factor was the "real" reason; what does one mean when he says that an action has many causes; what is the meaning of the general question, "why has he done it?"

[11] The Young Delinquent, New York, 1938.

Some of these problems can be answered and some can be dismissed as meaningless on the ground of the preceding analysis. But it is not justified to go that far before the common nucleus of all these problems has been subjected to severe scrutiny.

THE UNITY OF NATURE, LEAST-ACTION, AND NATURAL SOCIAL SCIENCE

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Detailed studies in social science often ignore the inherent interrelatedness between social science on the one hand, and the rest of natural science on the other. Indeed, as we shall try to illustrate in the following pages, it may be precisely the study of the special field against the background of the rest of science that will suggest a line of attack that leads to the solution of highly specialized problems. Our present discussion will begin with a consideration of certain primitive postulates that are made by natural science in general; and, with these postulates in mind, we shall analyze two sets of quantitative data that belong more particularly to the social field.

I

It is commonly assumed by natural scientists that there is a "unity of nature" in the sense of a "continuity of natural law." In other words, it is assumed that all of nature (i.e., "the entire universe") is organized as a single great unit according to a single body of law which operates at all times and at all places throughout the entire universe. According to this assumption, the same general natural law that governs the structure and behavior of astronomical bodies governs also the structure and behavior of our planet, of life on our planet, and, indeed, of even the smallest minutiae of living activity including the most subtle emotional and intellectual elaborations of human mind.[1] Thus as "time" passes in our universe, "matter" moves in "space" according to pre-established rules (or "laws") that are an inherent part of the original plan of the

[1]Astro-physicists, in studying astronomical phenomena, are far more aware of the relationship between their field and that of the "conscious" or "mental" than are the professional students of psychology. Indeed the former, in suggesting schematized outlines of classes of activity almost invariably make provisional classes for "mental phenomena."

universe. According to these rules (i.e., natural law), like things under like conditions will always and everywhere behave alike. The emergence of instances of "life" or of "consciousness" in the universe may represent the emergence of new conditions under which the original natural law will operate with new manifestation; but the emergence of neither "life" nor of "consciousness" represents the interfusion of new laws in the universe (i.e., God did not interrupt physical process with a "breath" that caused a re-arrangement of universal structure and behavior so that life might emerge). If we understood, for example, the laws governing the structure and behavior of stars, we should thereby also know, for example, the laws that govern human speech. Or, differently expressed, a complete understanding of any one thing entails a complete understanding of everything (an idea that is at least as old as Spinoza[2]).

In view of the implications of the above primitive postulate, social scientists, in their inquiry into social problems, are but concentrating their special attention upon certain details of universal activity. It further follows from the above postulate that all principles that have been disclosed as applicable to the rest of the universe will apply automatically to social phenomena, in so far as social phenomena contain conditions under which the more general principles operate. Thus, for example, we know that social phenomena are subject to the strictures of electro-chemical law and of gravitation because social phenomena involve matter. But we should not forget that social phenomena are subject to other propositions of natural science, one of which happens to be of particular value to the solution of social problems, as we shall presently see.

The proposition to which we refer might be succinctly stated as follows: <u>two superlatives make the solution of a problem indeterminate and meaningless.</u>[3] Or, stated in greater detail, a problem in dynamics can have only one maximum (or, minimum) and not more than one. Thus, for example, a submarine can try to sink (1) the <u>maximum number</u> of ships in a given interval of time, or (2) a given number of ships in a

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[2]E.g. cf. discussion of the Adequate Idea in Benedict de Spinoza's <u>Ethics</u> (English translation by A. Boyle, with introduction by G. Santayana, in The Ethics of Spinoza and "De Emendatione," Everyman's Library, No. 481, New York: E. P. Dutton).

[3]Wording adapted from L. J. Henderson's paper, "What is social progress?", in A SYMPOSIUM ON SOCIAL PROGRESS, <u>Proceedings of the American Academy of Arts and Science</u>, Vol. 73, No. 15 (July, 1940), p. 460.

minimum interval of time, but not (3) the maximum number of ships in the minimum interval of time. The indeterminacy and meaninglessness of this third proposition is self-evident.

The importance for social studies of this principle of the "single superlative" can be easily shown. For (1) if we return to the assumption of a unity of nature (or the continuity of natural law), and (2) if we view the organization of all nature as one single problem in dynamics, then (3) we note the following very interesting corollary, viz.: If we find the presence of a particular superlative (minimum or maximum) anywhere in the universe, we must conclude that it is inherent in all other natural phenomena. Thus, for example, if, in any part of the universe, we find a clear-cut instance in which "things" take a path of least-action, we must conclude that wherever else "things" take paths (i.e., move), they will similarly follow paths of least-action, and that will be true of "things" that move in the social field.

However, in selecting for discussion the above typical case of least-action, we should beware overlooking two possible sources of serious confusion--the one source, verbal; the other source, logical--that lie as pitfalls before almost every investigator.

II

As to the verbal pitfall, we must remember that the minimum of least-action can be described equally well by using other words. Indeed for the discussion of many actual problems, the minimum can doubtlessly be described more felicitously with other words. Yet a different verbal label will not necessarily entail the presence of a different minimum. Thus, for example, a particle in taking a path of least-action through a field of resistance, may be said to take a path of least-resistance. Here the difference between least-action and least-resistance is primarily verbal in the sense that the latter is but a variant of the former, since least-action will automatically involve the question of least-resistance in any problem in which resistance is a factor.[4]

There are further variants of least-action, such as least-work, least-labor, or, in more disguised form, the economical use of energy. In fact the exigencies of exposition of

[4] The behavior of the total field will be one of least-action.

particular problems may indicate the verbal label to be selected. Nevertheless fundamental drives remain fundamental drives, regardless of verbal dressing.

Other minima (or maxima) are conceivable if we recall our previous statement that "as 'time' passes, 'matter' moves in 'space.'" For, if the movement of matter in the space-time continuum is governed by the minimum of least-action, then it follows that neither space nor time are being minimized,--a deduction that is as important for social science as it is obvious. For if space were minimized, then matter would always move from one point to another over an invariable "straight-lined" path (shortest distance); but we observe, for example, that the paths of rivers, lightening, motor-cars, etc., are by no means always straight. Furthermore if time were minimized, then our whole life would be one of maximum gallop in all things, with no evidence of any tendency towards procastination.

Of course it sometimes happens quite incidentally, in the minimizing of action, that space and time are also "minimized." Thus, for example, a boy in running cross-lots towards an objective may thereby be saving both time and distance (space); but his saving of time and space is only incidental to his primary saving of action in a situation where a concomitant saving of time and space is inherent in the local givens. Boys, confronted by the prospective work of a wood-pile, have been known to waste both time and space in approaching the wood-pile in order to minimize action.

A straight-lined path, then, is only a special case of what we may call a least-action-distance, or a minimal energy-distance--depending upon our choice of words.

III

But in discussing the problem of verbal labels, we must not overlook the problem of logic inherent in extending ipso facto the minimum of one problem to all other problems. This ipso facto extension is justified only in so far as an assumption of a unity of nature or a continuity of natural law, is justified. For if there is no unity of nature, then the universe may not be viewed as a single problem, and hence the minimum of one problem cannot be automatically extended to any other.

Indeed, in pointing out the logical relationship between our assumption of a unity of nature and its corollary of the "universality of the single superlative," are we not incidentally putting our finger upon the very crux of the entire argument

that is now raging among students of social phenomena in reference to the question: "Are there social laws?"[5] In this argument about the existence of social laws, we notice that those who assume the unity of nature, or the continuity of natural law, conclude that there are social laws (and hereinafter we shall call them the natural social scientists). By the same token, those who believe that there are no such things as social laws, automatically (though perhaps tacitly and unwittingly) conclude that there is no such thing as a unity of nature. These opponents of natural law in the social field are often referred to as "political theologians" and "economic romanticists," quite analogous to the quacks in medical science.[6]

As to the opponents of social law, I cannot find out what postulates they do make. Since many of them, while denying the existence of natural social law, nevertheless attempt to enlighten the public and to motivate public action by means of a continuity of personal predictions on political, economic, and military matters--all based necessarily on a tacit assumption of some sort of underlying law or regularity--their practice would seem to belie their protests of "no social laws,"[7] were it not for one avenue of escape that is of course open to them: They might be God who, by definition, decides what the natural codes are to be. (The age-old argument: Is he God or charlatan?)

Nevertheless the validity of the assumption of a unity of nature, with its implication of a continuity of natural law, cannot be established by ridicule of, or ad hominem attacks upon, those who refuse to admit it. Moreover theoretical treatises on the subject of natural unity cannot establish it, so long as they themselves are based upon the assumption of the unity, even though the theoretical treatises may be of great value in revealing the logical implications of the assumption.

The unity of nature, the continuity of natural law, the

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[5]Cp. Henderson, ibid, also E. B. Wilson, "Social Progress," ibid, p. 469f.

[6]Cf. interesting discussion with bibliography in G. A. Lundberg, "Societal Pathology and Sociometry," Sociometry, Vol. IV (1941), pp. 78-97.

[7]Hence it is not difficult to understand why many of the opponents of natural social law have been subjected to charges of ignorance, mental confusion, exhibitionism (not to mention more serious terms from the vocabulary of psychopathology). These charges may be sound; also the charge that some act on the tacit belief that they are God (Messianic Complex). Documented studies of persons now living in the academic world and guilty of these practices would go far towards curbing them.

universal principle of least-action can be established only by rigorous empiric research before whose decision all minds must bow.

Nevertheless natural science does not make fundamental assumptions casually and for sport. The assumption of a unity of nature and a continuity of natural law are inductions from our experience with nature; moreover nothing has yet been found that contradicts them, though conceivably something may turn up tomorrow. These assumptions, even if they have become articles of faith today for many, are in fact only working hypotheses which in the past have been of considerable help in stating problems and in seeking solutions without restriction to any particular specialized field. Since our present interests are in the social field, let us suggest briefly how the postulates may be of help to us there.

IV

If we assume in the company of economists that man tries to save labor (i.e., is motivated by the consideration of least-action) in all his activities, we must conclude that he will automatically try to save labor in his exploitation of the raw materials of nature, not only in the procuring and manufacture of raw materials into finished goods, but also in his distribution and consumption of the same. (For convenience let us call this entire activity, Social-Economic Activity.)

Now because of the nature of geographical terrain in which man's raw materials are found, man's attempts to save labor in his social-economic activity will automatically lead to a conflict between two opposing "forces" which, for the want of better terms, we shall call the "Force of Diversity" and the "Force of Unification" respectively. (These forces are no sounder than the assumption of a labor-minimum from which they are derived.)

The Force of Diversity reflects the economy of labor inherent in living as closely as possible to the immediate source of our raw materials, in order to save labor in transporting these materials from their natural location to their place of human consumption. The word, diversity, is used to describe the effect of this economy upon the distribution of human habitations upon the earth's surface where raw materials are found. For, as a consequence of this economy, communities will be located immediately at the edge of the fish-pond, game-haunt, cornfield, and the like, so that the fish, game, and corn may be both procured and consumed with a minimal labor

of transportation. Consequently the human habitation of geographical terrain will be diversified according to the location of the terrain's natural stores. The communal life of the aboriginal Americans probably exemplified primarily this Force of Diversity in operation, for they lived in small, isolated, and largely autarchical settlements (permanent or migratory) close to their supplies with comparatively little transportation of goods. And we may imagine that any geographical terrain that is organized primarily under the Force of Diversity will similarly exhibit many diverse, comparatively small, isolated communities, with each community (by definition) being largely autarchical. So much, then, for the Force of Diversity.

The Force of Unification, on the other hand, comes ever more into operation as the goods of production and consumption become ever more "complex" under the advance of material civilization. That is, as the goods of production and consumption are manufactured from an ever greater diversity of materials (e.g., iron, tin, copper, lead, rubber, clay, fibers, etc.), it becomes increasingly less likely that all these raw materials can be found in any one single location, not to mention in each of many widely scattered ones. Hence the hitherto small and isolated communities, in desiring these more "complex" goods, can no longer remain autarchical. On the contrary they are immediately confronted with the familiar problem of importing the materials that they lack, and of paying for their imports with exports. There will therefore be an inter-community commerce, in which will be continuously present the need for minimizing the work of transportation.

In order to minimize the work of transportation, the inhabitants of the terrain will no longer find it necessarily profitable to remain split up into small communities at the immediate sources of raw materials. Rather does the obvious economy suggest itself of centralizing in one single spot not only all production (manufacture), but also all distribution and consumption, in order to minimize the transportation of goods into, through, and from the industrial processing. In other words, the Force of Unification operates in the direction of centralizing all social-economic activity in one single "Big City."

But the ideal economy of one "Big City," inhabited by the entire population, is impossible of realization as long as the necessary raw materials are not found in one spot. Even with a very advanced condition of industrialization, some members of the population must presumably still live and work at the actual sources of raw materials in order to procure the materials for the industrial machine. But the communities at

the sources of raw materials will no longer be commercially autarchical, since there will be a flow of traffic in raw materials to the industrial plants, and a return flow of consumable goods to the outlying communities if they are to share in the products of their combined efforts.

In sum, once we postulate a minimizing of work in a terrain, then there will follow quite logically a conflict between the opposing Forces of Diversity and of Unification; the effects of this conflict will be reflected in the number and sizes (and

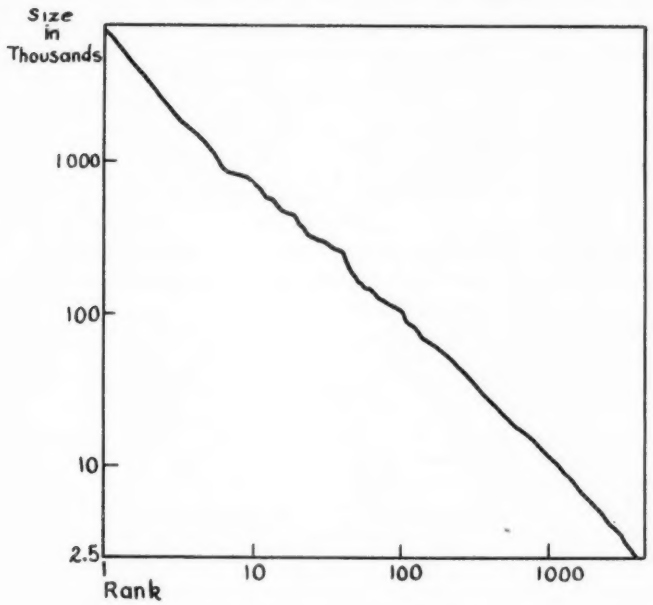

FIGURE I. U.S.A. 1930. Communities of 2,500 or more persons, ranked in the decreasing order of size of population.

indeed location) of communities. In short, there will be a law of community-size. Of course the actual number and sizes of communities in any given terrain will be determined, among other things, by the extent to which the goods of production and consumption are "complex" (as explained above). But our immediate concern is that "there will be a law." And by studying the number and sizes of actual cities, we may hope to verify our hypothesis of a labor-minimum.

In this connection we present in Figure I the data for communities in the U.S.A. in 1930, ranked in the decreasing order of size (with Rank on the Abscissa and Size on the Ordinate).

Thus ranked, the sizes of the communities follow the proportions of a harmonic series (viz., 1, 1/2, 1/3, 1/4,.....1/n).[8]

[8]Presented and discussed in G. K. Zipf, National Unity and Disunity, Bloomington Ind.: Principia Press, 1941. The first person to observe an instance of the proportions of what amounts to a true harmonic series was Felix Auerbach, "Das Gesetz der Bevolkerungskonzentration," Petermann's Mitteilungen, 1913, p. 74f. I regret that I did not know of this reference before the publication of my National Unity and Disunity, and hence did not include it there.) Auerbach's Law of Urban Concentration criticized by H. Mauer, "Zum Auerbach'schen Gesetz," Petermann's Mitt., 1913, p. 229f, to which I cannot find that Auerbach ever replied. Auerbach's harmonic series is but a special case, I believe, of a more generalized series (cp. Zipf, op. cit., Chaps. I-IV), in which negative slopes may lie between 9 and 1, inclusive. An instance of this slope of less than 1 (for the large cities of Europe) was observed by R. Gibrat, Les Inégalités Économique, Paris: Recueil Sirey, 1931 (cited Zipf, op. cit., p. 346), and reported graphically in his Fig. XI, p. 280. Gibrat's many quantitative observations on a diversity of material are extremely interesting, even though his pooling of statistical data for Europe may be open to criticism on the grounds of heterogeneity of data as far as cities are concerned (problem discussed, Zipf, op. cit., p. 184f). Though my own formula for the inear relations, which is recommended for other considerations, happens to differ from Gibrat's, nevertheless Gibrat's has priority to mine as I have explicitly stated (op. cit., p. 346). I mention this to counter the growing belief that there is an essential difference of laws instead of formulations. (Gibrat, in turn, is a pupil of Pareto.)

There are two shortcomings in the publications of Auerbach and Gibrat: (1) without a parameter for the area in which the sizes of cities, incomes, assets, etc. are measured, all measurements risk being nothing but artifacts (cp. Zipf, op. cit., p. 347), for, are we to study, say, the population and cities of Europe, or of parts thereof, like Germany, and, if parts, what parts? The second shortcoming (2) is that both Auerbach and Gibrat effectively ignore the abundance (indeed overwhelming number) of cases in which no linearity is discernible. My own book, op. cit. in returning to primary observations and building thereon, has tried to meet these shortcomings by means of a different formula, and by the postulate of a minimum expenditure of energy articulated in the working hypothesis of: The minimal total of all products of mass-moved by energy-distance-moved. But this postulate of least-action, or minimal expenditure of energy, is really the tacit assumption of classical economics, and hence not new, though perhaps new in being suggested as accounting for some of the linear distributions.

I wish to thank here again Professor S. S. Stevens of Harvard University for first calling my attention to Auerbach's publication, as well as to that of Albert J. Lotka who applied Auerbach's formula to the U.S.A. Census-data of 1920 in the latter's Elements of Physical Biology, Baltimore: Williams and Wilkins, 1925, pp. 306f.

In view of this and other observed distributions, few persons would be so bold as to ascribe the matter of the size-number of communities entirely to random chance.

But in discussing the configuration of Figure I we must beware drawing one conclusion. Our analysis of the Forces of Diversity and Unification did not prove that the above harmonically seriated distribution of Figure I is an inevitable consequence of every "well-ordered" society. For the final arbiters of any actual human social-economic organization (within the limits of our assumption of a labor-minimum) are the givens of the terrain. Because of the heterogeneous nature of the earth's surface, upon which man's social-economic activity is located, the number and sizes of cities will not necessarily be anything approaching recti-linearity.[9] The observed cases of close approximations to recti-linearity are "freakish," in the sense that they represent a concatenation of unusually favorable conditions, and should not disguise the abundance of observed cases of non-rectilinearity.[10]

However the above disquisition on community-size was undertaken primarily to provide an instance of social law, in order to confront those who dogmatically insist that there are no social laws. By assuming a unity of nature, and by extending the principle of least-action (in its variant form, least-labor) to the social-field, we have found reasons for suspecting

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[9] With advances in the technique of exploiting energy, together with its applications to problems involving transportation, society may become ever more (though hardly completely) emancipated from regional exigencies of terrain, in the sense that the Force of Unification becomes stronger and stronger (cp. Zipf, op. cit., Chap. III).

[10] Ibid. Chap. IV. If one postulates least-action, and remembers the spherical nature of the earth's surface, then one may theoretically anticipate some such inverse-distance-relationship as that observed by J. Q. Stewart, "An inverse distance variation for certain social influences," Science, Vol. 93, No. 2404 (Jan. 24, 1941), pp. 89-90, if one takes for granted the existence of commercial drives. Stewart's inverse-distance-ratio is intimately connected mathematically with the proportions of the harmonic series (cp. Zipf, op. cit., p. 346, also Zipf, "Homogeneity and Heterogeneity in Language," Psych. Record, II (1938), pp. 347-367), and can be tied together doubtless with our above Forces of Unification and Diversity. The proportions of a harmonic series are different from those of the inverse square by a small constant (cp. ibid) which may conceivably be connected with the curvature of the earth's surface which may not be ignored in problems involving extensive areas.

the existence of a law of community-size and community-number. And we have found an instance in which the number and sizes of communities are distributed in a way that could not be anticipated by probabilities.

Of course the opponents of natural social science, far from being shaken by the data of Figure I, may (and often do) retort in effect: Certainly there are natural laws governing matter; but, alas, how about the "immaterial" things of life. In short they believe in a unity of nature for the domain of matter, beyond which, and outside of which, are ill-defined immaterial "things" which are presumed to obey no natural law.

V

Now, speech is largely an immaterial "thing," whereas "meaning" is almost entirely immaterial. Let us very briefly look at the distribution of words in the stream of speech where, as we shall see, we may again expect to find our previously discussed Forces of Diversity and Unification on the basis of our postulates.

To begin, there would be an economy of effort in having a vocabulary that consisted exclusively of only one single word which would be used for all verbal purposes. The single-word-vocabulary would save the "mental effort" which would otherwise be necessary to "think" of the "right" word. Thus if one hand, instead of a single word, a vocabulary of many different words to select from for the purposes of verbalization, one would presumably have to spend some effort in thinking of which word to use. A single exclusive word would minimize this effort of selection. The economy of the single word would be a manifestation of our Force of Unification, with the single word being roughly analogous to the single "Big City."

But, on the other hand, there is an economy in possessing a particular and precisely distinct word (or verbal reference) for each separate "thing" referred to, in order to minimize the mental effort necessary for understanding the verbal reference.[11] A vocabulary organized solely under the force of

[11] We are assuming in the company of others that "thinking" involves work (or labor, of "mental effort") that is subject to a minimizing. Though the "mental effort" minimized may be in the auditor and not the speaker, nevertheless the auditor is not only a potential speaker, but also generally (not always) a prerequisite to discourse (cp. G. K. Zipf, Psycho-Biology of Language, Boston, Houghton Mifflin, 2ed. 1939, Chap. V, also pp. 212-215).

this second economy (a manifestation of our Force of Diversity), would be just as replete with distinctly different words, as the speaker's "mind" were replete with different referents to which his verbalizations ultimately refer.

Hence an actual vocabulary, in being organized with maximum economy of labor, would be subject to both forces and represent a compromise between (1) one and the same word for all verbal referents, and (2) a particular word for each different verbal referent; or, expressed differently, a compromise between (1) a single word of 100 percent frequency of occurrence, and (2) a large number of different words of comparatively low percentages of relative frequencies of occurrence.

Since the above hypothetical conflict and compromise between the two opposing forces in speech may be difficult for the reader to visualize, let us reify it by resorting to the analogy of a set of tools where the same factors are found present. Thus, for example, there is an obvious economy in having (1) a single tool for performing all different jobs, and also in having (2) a specialized tool for each and every different job. Hence an actual kit of tools (or an actual workshop) whose artisan works at different tasks (or at an involved single task) will reveal a compromise between (1) a tool or tools that save work by being capable of performing many different jobs, and (2) tools that will save work by performing particular jobs with added economy (i.e., the specialized tools). Therefore there will be a law governing the number and relative frequencies of usage of tools.[12]

Leaving now our tool-analogy, and resuming our consideration of the number and frequencies of usage of words, which are also "tools" for performing jobs,[13] we may theoretically expect for analogous reasons that there will be a law governing the number and relative frequencies of usage of words (on the basis of our postulate that "thinking involves the expenditure of labor"). In Figure II we present a now famous

[12]Discussed in detail, G. K. Zipf, "On the economical arrangement of tools; the harmonic series and the properties of space," Psych. Record, IV, (1940), pp. 147-159. Extending the above remarks on repetitiveness in speech, we may say that repetition (or perseveration) in general is economical. For example, the repeated and exclusive use of a hammer saves the work of laying it down and of selecting and picking up some other tool, and so on. A variant of this is specialized labor.

[13]For discussion of language as tools, cp. Zipf, Psycho-Biology, op. cit., Chap. I.

distribution of the frequency of usage of words in James Joyce's Ulysses.[14] We note incidentally in Figure II that the formula is that of the harmonic series which we found also in Figure I.

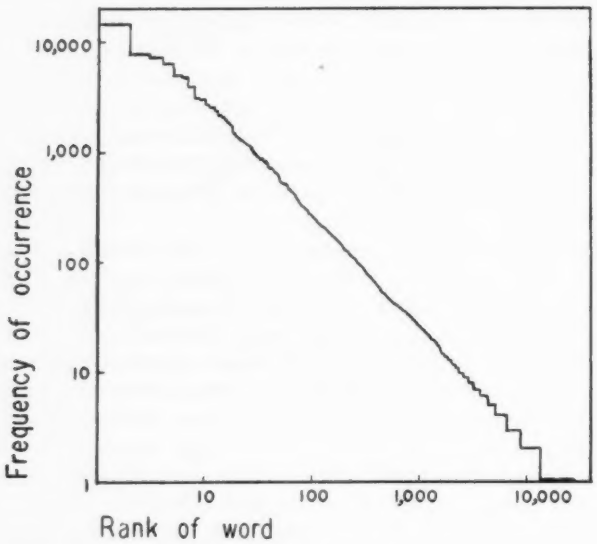

FIGURE II. Frequency Distribution of Words in James Joyce's Ulysses (Hanley Index).

The data of Figure II reveal the existence of some law that governs word-selection. And since the average person, in speaking, commonly selects and uses words primarily because of their meanings (and not the reverse[15]), we may suspect that

[14] M. L. Hanley, Word Index to James Joyce's Ulysses, Madison, Wis., 1937 (statistical tabulation by M. Joos). The first person (to my knowledge) to note the hyperbolic nature of the frequency of word-usage was the French stenographer, J. B. Estoup who made statistical studies of French; cf. his Gammes Sténographiques, Paris, 4ed., 1916 (I have not seen the first edition that appeared in 1907). Others subsequently observed the same general relationship in various languages without attempts at precise formulation. The first precise formulation in terms of negative slope of 1 was by E. V. Condon, "Statistics of Vocabulary," Science, Vol. 67, (1928), p. 300. The most perfect fit of harmonic series to date is that of the Hanley Index (op. cit). Numerous deviations from harmonic series, and different slopes have been observed.

[15] There are nevertheless instances where persons use words without reference to their meanings, simply because they feel that

"meaning"--whatever its nature--is subject to law. Hence if "meaning" is something "immaterial" and "soulful," as some aver, then we must conclude that at least to some extent the "immaterial" and the "soulful" are subject to natural law.

And, after all, why not?

VI

In light of the previous discussion of certain primitive postulates of natural science, and in light of our exposition of two fairly detailed studies relative to man's social behavior, we have noted (1) evidence of an essential interrelatedness of all science on the one hand, and of certain departmentalized parts on the other. This interrelatedness, in which many believe, is normally described, as we have said, with the terms Unity of Nature (or Continuity of Natural Law). We have noted (2) the practical help, in solving problems, that may result from analyzing both the general and the particular aspects of the problem, without any reference to the departmentalization of science.

The fact that our two selected examples of distribution are so similar in algebraic statement gives a clue to the possible theoretical explanation of both of them, if we pause to ask what these two widely separated sets of data have in common.[16] The things they have in common are obviously (1) space as we observe it, (2) time as we measure it, and (3) matter as we are aware of it. The harmonic series, after all, is closely related to the ratio of the inverse square which, in turn, is inherent in three dimensional space. We know that the inverse square relationship is venerable in physics (e.g., gravitation, electricity) and is found notably where action is involved. We should not be surprised to find evidence of it in "biological" and "mental" phenomena where action is also involved.

It might be averred that the same type of argument that we have used could be applied to everything else, even

(footnote cont'd.)
the words sound well, or ill, or elegant without really knowing the word's meaning. On the whole, words are selected primarily because of their meanings.

[16]Many other examples of similar empiric social laws could be cited, cp. Gibrat, op. cit., or Willis' Law in C. J. Willis, A Study in Geographical Distribution and Origin of Species, Cambridge, England: Cambridge Univ. Press, 1922. All of these laws are apparently isomorphic.

down to and including man's innermost dreams.[17] In reply it must be remarked that the argument not only may be thus applied, but also frequently is so applied. Thus, for example, if man has an immortal soul, as many believe, then, according to our argument, that immortal soul will exist in obedience to the principle of least-action. And whether or not man has such a soul may very well be decided one way or another by scientific inquiry, perhaps even sooner than we think. For though it is "bad form" today in science to mention the "soul," the "soul" nevertheless offers a perfectly legitimate problem to science, in spite of its abuse today by "political theologians" and "economic romanticists" who resort to it as to a deus ex machina in order to win arguments.

In closing, let us remember that many of our above remarks in respect to universals may be censured for being "dangerously sweeping." In reply we state that the assumption of a Unity of Nature (and a Continuity of Natural Law) is also "dangerously sweeping." There is, after all, no point in our making the primitive assumptions of natural science, and then cravenly trembling before the possibilities of their logical implications for our problems.

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[17] For economy of dreams, cp. J. F. Brown, The Psychodynamics of Abnormal Behavior, New York: McGraw-Hill, 1940, p. 289 and passim.

A MEASURE OF THE INFLUENCE OF A POPULATION AT A DISTANCE

John Q. Stewart
Princeton University Observatory

1. The Geographical Distribution of Undergraduates. This report deals specifically with the geographical distribution of the residences of undergraduates at Harvard, Massachusetts Institute of Technology, Princeton, and Yale. The sample studied includes roughly 5,000 undergraduates from each of these four institutions, enrolled in seven or eight consecutive classes centering around the late 1930's. Various official publications of the institutions concerned give residences by states for all undergraduates or for the entering classes. The compilation by states is presented in Table 1.

In two preceding brief papers[1] it was shown that the number of undergraduates in such a "national" college from a given state tends, on the average, to be proportional to the state's population (for the present four colleges the native white male populations) divided by the distance in miles to the campus. The present study establishes this inverse-distance relation more objectively, thanks to a least-squares solution which Dr. Hans A. Panofsky of Wilson College has contributed.

2. "Potentials of Population." In Table 2 are listed the approximate distances in miles from roughly-guessed-at centers of population in each state, to each college. The average distance of a college to its own state could be got reliably only through a detailed computation using the county map of that state in relation to the rule of population divided by distance. This somewhat laborious procedure was not followed, and therefore in the solution for Yale, Connecticut was omitted, while Massachusetts was omitted for Harvard and M.I.T.

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[1] John Q. Stewart, "An Inverse Distance Variation for Certain Social Influences," Science NS 93, 89, 1941; "The 'Gravitation,' or Geographical Drawing Power, of a College," Bulletin, American Association of University Professors, 27, 70, 1941.

Table 1

ACTUAL NUMBERS OF UNDERGRADUATES

State	Princeton	Yale	Harvard	M.I.T.
New England				
Me	16	29	39	50
NH	12	26	63	42
Vt	12	21	15	18
Mass	112	360	1765	2067
RI	37	46	46	79
Conn	161	1265	138	216
Middle Atlantic				
NY	1213	1397	777	883
NJ	1236	391	150	316
Pa	784	380	247	256
Del	32	18	5	22
DC	89	57	42	95
East North Central				
Ohio	193	306	204	154
Ind	31	34	80	28
Ill	207	252	207	191
Mich	65	90	83	62
Wis	27	48	64	28
Border				
Md	195	52	42	47
WVa	45	21	20	25
Ky	29	28	37	28
Mo	89	94	91	89
Okla	11	29	6	14
West North Central				
Minn	33	100	107	29
Iowa	18	13	44	17
ND	2	0	2	7
SD	0	7	9	5
Neb	5	13	16	13
Kan	8	14	10	14
Southern				
Va	45	40	27	35
NC	29	13	8	13
SC	17	5	9	8
Ga	42	23	20	18
Ala	31	11	12	18
Miss	6	6	4	6
Ark	10	6	3	7
La	10	15	8	20
Tex	53	24	25	58
Tenn	30	20	45	20
Fla	32	29	26	28
Mountain				
Mont	13	0	6	11
Idaho	2	1	2	1
Wy	3	4	5	3
Colo	31	65	11	51
NM	3	6	12	13
Ariz	3	6	4	8
Utah	3	3	5	15
Nev	0	1	1	2
Pacific				
Wash	24	25	32	38
Ore	8	15	16	18
Calif	87	91	89	80
Totals:	5145	5500	4679	5266
Grand Total	20590	(19748 being east of Colorado)		

Table 2

POPULATIONS, AND APPROXIMATE DISTANCES

State	Population in millions (native white male: 1930)	Distances: miles P	Y	H-MIT
New England				
Me	0.350	390	285	155
NH	0.190	275	175	70
Vt	0.160	285	175	125
Mass	1.533	215	110	30?
RI	0.247	210	95	50
Conn	0.588	130	25?	135
Middle Atlantic				
NY	4.441	95	100	175
NJ	1.482	31	125	230
Pa	3.956	88	220	305
Del	0.095	90	220	325
DC	0.153	160	290	400
East North Central				
Ohio	2.846	430	540	605
Ind	1.499	625	740	830
Ill	3.027	740	855	945
Mich	1.951	515	600	685
Wis	1.282	770	820	945
Border				
Md	0.629	150	255	375
WVa	0.796	350	490	555
Ky	1.197	590	720	835
Mo	1.626	950	1090	1100
Okla	1.078	1300	1425	1500
West North Central				
Minn	1.085	1000	1135	1180
Iowa	1.151	1000	1110	1200
ND	0.294	1375	1360	1500
SD	0.314	1325	1425	1500
Neb	0.630	1300	1410	1475
Kan	0.876	1250	1330	1450
Southern				
Va	0.880	245	370	475
NC	1.115	380	515	660
SC	0.470	560	730	815
Ga	0.913	730	855	975
Ala	0.848	850	1000	1065
Miss	0.501	975	1170	1210
Ark	0.696	1050	1185	1275
La	0.644	1150	1330	1375
Tex	2.135	1500	1615	1700
Tenn	1.064	735	860	975
Fla	0.490	950	1100	1180
Mountain				
Mont	0.237	1750	1850	1900
Idaho	0.214	2075	2200	2250
Wy	0.105	1625	1720	1775
Colo	0.443	1575	1720	1775
NM	0.167	1725	1870	1950
Ariz	0.132	2000	2150	2175
Utah	0.230	1925	2070	2100
Nev	0.039	2225	2300	2350
Pacific				
Wash	0.658	2400	2425	2450
Ore	0.427	2325	2425	2450
Calif	2.123	2425	2525	2600

Table 2 gives also the native white male populations, U.S. Census of 1930, of the states.

In the two previous papers the tentative name "potential of population" was used for the quotient obtained by dividing the population by the average distance to the point where the "potential" is evaluated. Possibly "coefficient of influence" would be a better name. "Potential" is suggested by the analogue of electrostatic potential (charge divided by distance) and of gravitational potential (which is proportional to mass divided by distance). (In mathematical physics, however, the term "potential" has a general meaning which is not satisfied over a plane by an inverse-distance variation--although such a variation does yield the "potential" in three dimensions.)

The important point is not the name but the ratio itself, population divided by distance. For certain purposes this ratio is a measure of the influence of the given population at a distance. This coefficient is, by its definition, to be evaluated in units of individuals per unit distance--for example, individuals per mile, or, alternatively, millions of people per kilometer, and so on.

It contrasts with the familiar "density of population," people per square mile, within a given district. Electrostatic theory uses similarly the surface density of electrical charge.

Table 3 presents the approximate "potential of native white male population" of the 48 states and the District of Columbia, at the three points studied, namely, Princeton, New Jersey, New Haven, Connecticut and Cambridge, Massachusetts--as computed from the data of Table 2 (for 1930).

Table 4 lists the respective ratios of undergraduates (from Table 1) to these "potentials." If the formula described in section 1 were exact these ratios would all be constant for a single college. Their actual variations are a test of the statistical fit of the formula.

As stated in the two previous publications, the formula holds statistically for undergraduates and alumni of the institutions examined for the 37 states east of the Colorado line. The 8 Rocky Mountain and the 3 Pacific Coast states contribute two or three times more undergraduates than the formula would indicate.

3. Determination of the Inverse Distance Rule by Least Squares. In Dr. H. A. Panofsky's least-squares study, which started with the data of Table 4, the ratios for the 8 Mountain and 3 Coast states were omitted. He took logarithms of the ratios of Table 4 (which represent actual

Table 3

"POTENTIALS OF POPULATION"

State	Persons per mile P	Y	H-MIT
New England			
Me	900	1200	2260
NH	690	1110	2710
Vt	560	900	1280
Mass	7130	13900	51440?
RI	1180	2600	4940
Conn	4520	50000?	4360
Middle Atlantic			
NY	46750	44400	25400
NJ	48000	11800	6440
Pa	45000	18000	13000
Del	1060	400	290
DC	960	500	380
East North Central			
Ohio	6620	5300	4700
Ind	2400	2000	1810
Ill	4090	3500	3200
Mich	3790	3200	2850
Wis	1670	1600	1350
Border			
Md	4190	2500	1680
WVa	2270	1600	1430
Ky	2030	1700	1430
Mo	1710	1500	1480
Okla	830	730	720
West North Central			
Minn	1090	940	920
Iowa	1150	1000	960
ND	210	200	190
SD	240	200	210
Neb	480	440	430
Kan	700	660	600
Southern			
Va	3590	2400	1850
NC	2930	2200	1690
SC	840	650	580
Ga	1250	1100	1010
Ala	1000	900	800
Miss	510	450	410
Ark	660	600	550
La	560	500	470
Tex	1420	1300	1260
Tenn	1450	1200	1090
Fla	520	440	410
Mountain			
Mont	140	130	120
Idaho	100	100	100
Wy	70	60	60
Colo	280	260	250
NM	100	90	90
Ariz	70	60	60
Utah	120	110	110
Nev	20	20	20
Pacific			
Wash	270	270	270
Ore	180	180	170
Calif	880	830	820

Table 4

RATIOS OF UNDERGRADUATES TO "POTENTIAL"

State	P	Y	H	MIT
New England				
Me	0.0178	0.0242	0.0172	0.0221
NH	174	236	232	155
Vt	215	233	117	141
Mass	158	258	343?	402?
RI	314	177	94	160
Conn	357	253?	315	495
Middle Atlantic				
NY	260	314	307	348
NJ	258	330	233	490
Pa	173	211	191	197
Del	302	450	172	760
DC	930	1140	1110	2500
East North Central				
Ohio	292	579	434	327
Ind	129	170	441	154
Ill	508	720	649	597
Mich	176	281	291	218
Wis	162	300	475	207
Border				
Md	466	208	250	280
WVa	198	131	139	175
Ky	143	164	258	196
Mo	520	626	615	600
Okla	132	398	83	195
West North Central				
Minn	303	1060	1160	315
Iowa	157	130	458	178
ND	95	0	105	368
SD	0	350	427	238
Neb	104	296	372	303
Kan	114	212	167	233
Southern				
Va	126	167	146	189
NC	99	59	47	77
SC	202	77	155	138
Ga	336	209	198	178
Ala	310	122	150	225
Miss	118	133	98	147
Ark	151	100	55	126
La	178	300	171	425
Tex	373	184	198	461
Tenn	207	167	411	191
Fla	615	659	634	684
Mountain				
Mont	930	0	500	920
Idaho	200	100	200	100
Wy	429	667	833	500
Colo	1011	2500	444	2040
NM	300	667	1333	1440
Ariz	429	1000	667	1330
Utah	250	273	455	1370
Nev	0	500	500	1000
Pacific				
Wash	890	928	1190	1410
Ore	444	834	940	1050
Calif	990	1090	1080	975

undergraduates divided by "potentials of native white male populations"), and he compared these, for each college separately, with logarithms of the corresponding distances listed in Table 2. He postulated that the actual best formula was: Number of undergraduates proportional to native white male population divided by the distance raised to the power n--or log Undergraduates equals constant plus log Population minus n times log Distance. The solution therefore determines objectively how near n is to negative unity.

Application of well-known methods of Least Squares resulted in the following values for n:

Princeton	-1.128 ± 0.029
Yale	-1.017 ± 0.047
Harvard	-0.873 ± 0.055
M.I.T.	-0.963 ± 0.036
Mean	-0.995 ± 0.036

(where the $\pm$ signs as usual denote the probable errors.)

The mean is astonishingly close to negative unity; and is the result for a total of 19,478 undergraduates having residences distributed over 37 states and the District of Columbia.

The average probable error for a single state and college is a factor a little less than 1.5--which is to say that in half the cases east of Colorado the "formula undergraduates" for a given state and college match the actual undergraduates within a factor of 1.5.

4. Systematic Geographical Variations. Returning to the study of n, the difference between the indicated exponents for Princeton and Harvard is large enough, as compared with the probable errors, to be significant by the usual tests--which means that there is some indication that Harvard draws students a little more strongly than Princeton from the larger distances.

However, an examination of the ratios of Table 4 shows that this may be largely a matter of what might be called a "specific areal characteristic" rather than a true association with distance as such. Harvard and Yale both draw relatively more students, after allowing for population and inverse distance, from the Middle West, from Ohio to Nebraska, than does Princeton (the factor averaging about 1.3 in the East North Central and more than 2 in the West North Central). Princeton makes up for this by enjoying the relative favoritism of the Border and the South.

Certain states run systematically high in actual quotas for all four colleges--including particularly Illinois, Missouri, Florida (factors of about 2), in addition to the Far West. Others, including several in the south, run low for all four. If instead of native white male populations some such groups as the total numbers of high school students were used in the "potentials" these systematic discrepancies might be improved. This matter has not been examined.

These findings are from a point of view different from that adopted in the extensive study of geographic distribution of college students by Professors Foster and Dwyer.[2] In particular the present study, as just explained, shows that there is not much difference in the "national" character of the distribution of Harvard, M.I.T., Yale and Princeton. The classification by Foster and Dwyer of Princeton as "sectional" is definitely unjustified in the light of the more refined statistics here developed.

5. Limitations of the Inverse Distance Rule. If the states of Mexico, and even the provinces of Canada, were added to the tables of the present paper the deficit of the actual as contrasted with the computed quotas would be large. The rule of inverse distance, therefore, even for the best-known universities, applies only within a certain territory.

Such a limitation was emphatically illustrated by a study of the circulation of a St. Louis newspaper by counties in Missouri and Illinois. Its territory was sharply limited, evidently by competition from newspapers published in Chicago and Kansas City--yet within a boundary ranging between 120 and 160 or so miles around St. Louis, sales by counties approximated, on the average, proportionality to the ratio, population of the county divided by distance from the city. A small college doubtless would show some such limitation--although for a college competition perhaps never proceeds to complete elimination.

Another limitation, applying in near-by areas, turned up in the newspaper study--as it already had in an examination of visitors to the New York World's Fair. Close at hand the newspaper, in order to conform to the inverse distance rule, as calibrated by distant sales, would have had to sell considerably more than one copy per family. Here we have a "saturation"

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[2] C. R. Foster, Jr., and P. S. Dwyer, "A Study of the Geographic Distribution of Students," Rutgers University Bulletin, July, 1931, Series VII, Number 1.

or "clean-out" effect, the necessity of which is obvious--but colleges do not draw enough students per capita of the general population to make "saturation" important, even quite near the campuses.

The necessity of applying a characteristic factor to certain populations has already been indicated in the above discussion of the four universities. Such a factor might be called the "susceptibility."

Still additional refinements might be indicated. The suggested coefficient of influence, population divided by distance, merely serves to eliminate from certain problems those two brute mechanical factors. What is left over is often the really interesting part.

Demographers have long used the concept of the density of a population. The "potential of population" is a sort of smoothed-out density, but of course it is not merely a density, any more than electrostatic potential is charge-density.

The introduction of some measure of influence at a distance, whether the "potential" or another, is a necessity in many important social, economic, and political problems. Indeed the failure of policymakers in public affairs to recognize the raw physical factors of number and distance has been a most unfortunate contributing factor to the tragedy of the times.

Princeton University Observatory,
January 13, 1942

THE INFLUENCE OF PARTY PREFERENCE UPON THE RESPONSES OF AN AUDIENCE TO A POLITICAL SPEECH

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The following report is concerned with the responses of student audiences to a speech made in the fall of 1937 on the New Deal and its fiscal and economic policies. At the time this is written there is a diminished interest in the issues with which the speaker dealt. We are concerned here, however, not so much with current states of public opinion as with the general laws of speaker-audience reaction. The literature contains many rules, axioms, and generalizations which have purely empirical foundations, as well as some experimental and descriptive studies. This study falls in the latter category, and deals primarily with the effects of party preference, or prejudice, upon the response tendencies of an audience.

The speech material used was provided through an address delivered by General Hugh Johnson over one of the national radio networks. It was recorded at the time of its delivery on a sixteen inch disk by the Visual Education Service of the University of Minnesota for use in the classroom. The speech was then played a number of times before a committee of teachers in social science and current affairs to determine its central propositional ideas. Nine were selected as being representative, cast into the form of questions, and listed on the following response form-sheet along with informational items and a rating scale.

When all preliminary arrangements had been completed the speech was presented to three student audiences in the General College of the University of Minnesota. The following procedures were used in all three groups. The mimeographed response sheets were placed in the hands of the students and they were asked to read the general statement at the top of the page and provide the information requested concerning sex, age, and political preferences of parents and self. The subjects were next asked to examine the nine questions and to write yes, no, or undecided in the spaces on the left-hand side to indicate their attitudes and beliefs. Attention was then

AN EXERCISE IN CRITICAL LISTENING

You are about to hear a speech made by General Hugh Johnson over the National Broadcasting Company Network on the evening of November 9, This speech deals with the financial policies of your Federal Government. Listen attentively to the speech and to the instructions for the use of this questionnaire.

General Information: Your name (optional) _____ Your sex ___ Age ___ Your father's political party. _____ Your mother's political party _____ Your own political party _____. Are you in general favorable to the New Deal and its policies: yes, no, undecided. Did you hear this speech when it was originally broadcast: yes, no.

Following are some of the questions which the speaker will discuss. Indicate your present opinion on these questions by writing yes, no, or undecided in the space provided in front of the question.

1. _____ Has government spending slowed up business recovery?

2. _____ Has government spending helpd business recovery?

3. _____ Does Roosevelt control American business like a dictator?

4. _____ Do present Federal taxes on business slow up recovery?

5. _____ Is complete business recovery being prevented by a lack of confidence in the financial policies of the government?

6. _____ Is the government opposed to the businessman making a profit?

7. _____ Has the government slowed up recovery by taking away the businessman's hope for a profit?

8. _____ Do the government's policies make it difficult to successfully start a small business?

9. _____ Does the government seem to regard the profit-seeking businessman as a villain?

Indicate on the following scale your opinion of the effectiveness of the speaker without consideration for the merits of his arguments:

very poor	poor	moderately effective	good	very good

Comments on effectiveness:

called to the general rating scale at the bottom of the page with instructions that it was to be used to record their impressions of the quality of the speaker's delivery. The recorded speech was then played on an electrical reproducing machine.

As soon as the speech was finished, the subjects were asked to rate the speaker on the general scale and to write their comments on delivery in the space below. They were then asked to write yes, no, or undecided, after each of the nine questions to indicate their attitudes after having heard General Johnson's speech. They were next instructed to examine their two sets of responses to the nine questions, and to explain in writing any changes of opinion which had occurred as a result of hearing the speech.

GROUP DIFFERENTIATION BEFORE HEARING SPEECH

The information provided on the response-blanks showed that the students could be divided into three relatively large groups according to their choice of political party; fifty declared themselves to be Democrats, twenty-six of them were Republicans, and forty-nine of them indicated that they identified themselves with no political party. In addition to these there were three Farmer-Laborites and three Socialists.

Table 1

STUDENTS' PARTY PREFERENCES AND PARENTS' PARTY PREFERENCES

Students' Choices	Parents' Choices: Fathers D	N	R	F	S	deceased
Democrat (D)	34	9	3	1	00	3
None (N)	20	15	8	2	00	4
Republican (R)	2	2	20	00	00	2
Farmer-Labor (F)	1	00	00	2	00	00
Socialist (S)	2	00	00	00	00	1
	Mothers					
Democrat (D)	26	10	7	1	00	6
None (N)	13	24	10	2	00	00
Republican (R)	4	4	17	00	00	1
Farmer-Labor (F)	00	1	00	2	00	00
Socialist (S)	2	1	00	00	00	00

Table 1 shows the distribution of party preferences of the students, and the coincidence of their choices with the party affiliations of their fathers and mothers. For example, among the fathers of the fifty Democrat students, there were thirty-four who were Democrats, nine with no party affiliation, three Republicans, one Farmer-Laborite, no Socialists, and three not living. An examination of the whole table of frequencies shows considerable identification of student and parent party affiliation among the Democrats and Republicans, particularly as regards the fathers. Seventy-two percent of the living fathers and fifty-nine percent of the living mothers of the Democratic students were Democrats, whereas eighty-three percent of the living fathers and sixty-nine percent of the living mothers of the Republican students were Republicans. The non-party students show a higher proportion of non-party parents than do the Democrats and the Republicans. The validity of any conclusions from these data regarding the coincidence of student-parent political party depends, of course, upon the assumption that the student's report of his parents' party choices are accurate.

Differentiation was also found between the major groups in respect to their initial opinions relative to the propositional ideas contained in General Johnson's speech. The proportions of the Democrats, Republicans, and non-party students responding "yes," "no," and "undecided," prior to hearing the speech are given in Table 2.

Table 2

INITIAL RESPONSES OF PARTY GROUPS TO NINE POLITICAL QUESTIONS

Party Choice	Yes	No	?	Yes	No	?	Yes	No	?
Democrat	1. 14	78	8	4. 30	30	40	7. 10	74	16
None	10	86	4	38	35	27	22	68	10
Republican	31	46	23	62	19	19	38	43	19
Democrat	2. 84	14	2	5. 38	32	30	8. 22	58	20
None	82	16	2	55	29	16	39	43	18
Republican	50	38	12	76	12	12	69	27	4
Democrat	3. 00	98	2	6. 4	96	00	9. 10	82	8
None	6	82	12	12	76	12	8	76	16
Republican	27	58	15	35	53	12	15	81	4

For example, fourteen percent of the Democrats, ten percent of the non-party group, and thirty-one percent of the Republicans answered "Yes" to the first question, "Has government spending slowed up business recovery?" In respect to all nine questions the Republicans show a higher proportion of responses favorable to the speaker's point of view than do the Democrats. When all three main groups, Republicans, Democrats, and non-party students, are considered, the distributions of frequencies appear to be significantly different for Questions 1, 2, 3, 5, 6, and 8. Questions 4 and 7 are somewhat doubtful, and Question 9 is very doubtful. These conclusions result from the application of the chi-square test of independence to the basic frequency values underlying the percentages in Table 2.

Differentiation as between the main groups was also found with respect to their answers to the question, "Are you in general favorable to the New Deal and its policies?" A large majority of the Democrats answered "Yes" to this question, a plurality of the non-party students answered "Undecided," and a majority of the Republicans answered "No."

From the foregoing analysis it is evident that the three designated divisions of students among the subject group are significantly differentiated with respect to their initial attitudes toward the propositional ideas in General Johnson's speech, their attitudes toward the New Deal, and the political party affiliations of their parents. As regards the latter, some facts relative to sex differentiation in student-parent identification appear in these data. Among the seventy-six Democratic and Republican students there were twenty-eight women, sixteen of whom were Democrats and twelve Republicans. All of the fathers of these twenty-eight women were living at the time of this study, and in twenty-six cases the political party indicated by the student for her father was the same as that indicated for herself. The fathers of forty-three of the male Republican and Democrat students were living, and among these the claimed political party preferences of twenty-eight were identical with those claimed for the father. It appears then that among the Democrat and Republican students there was a significantly closer identification between daughter and father than between son and father. The data also showed a closer identification of daughter with mother than of son with mother, but the results were not statistically significant.

EFFECT OF THE SPEECH ON STUDENT OPINION

General Johnson's speech, a radio address of about fifteen minutes in length, was an attack upon the taxing and spending policies of the New Deal. The speaker's position was

affirmative with respect to all the questions on the response-sheet except the second one, where it was negative. The style of delivery and phraseology were direct and vigorous. The students hearing the recorded speech were instructed to regard the project as an exercise in critical listening. They seemed to give excellent attention to the address.

In scoring the results all changes of opinion toward the position taken by the speaker were given a plus value of one. On the first question, for example, a change from "no" to "yes," "no" to "undecided," or "undecided" to "yes" were given a plus value of one. A minus value of one was given to each change in the opposite direction. Seventy-eight of the total of one hundred and twenty-five Democrat, Republican, and non-party students, showed a change of opinion on one or more of the nine questions. There was a total of one hundred and forty-five plus changes and thirty-three minus changes.

We are interested here mainly in the differential effects of Johnson's attack upon the New Deal on the three main divisions of the subject group, as well as the possible effects of political party preference upon the students' judgment of the delivery of the speaker. It does not seem feasible to bring the Socialist and Farmer-Labor groups into the analysis in view of their small numbers. In order to compare the responses of the three groups to the speech, it seemed necessary to secure some index which would take into account group differences in initial opinion. Since the Democrats agreed less with the speaker prior to hearing the speech than did the Republicans, their opportunities for opinion changes favorable to the speaker's point of view were correspondingly greater. Table 3 shows the total possibilities of plus change in the different groups, and the number of plus changes which actually occurred. Alongside the latter, in parentheses, are given the independence values, i.e., the frequencies which theoretically would be expected if the number of plus changes were proportional to the total number of possible plus changes.

Table 3

DISTRIBUTION OF PLUS AND MINUS CHANGES OF OPINION

Party Choice	Plus Changes		Minus Changes	
	Possible	Actual	Possible	Actual
Democrat	380	55 (65.30)	133	12 (10.38)
None	340	55 (57.53)	160	18 (12.48)
Republican	131	34 (22.17)	130	3 (10.14)

It will be observed that the frequency of positive changes among the Democrats is less than would be expected, whereas the frequency of plus change among the Republicans is greater than would be expected. The sum of the chi-squares resulting from the divergence of fact from hypothesis in the table as a whole, including the non-party group, falls slightly below the two percent level of confidence. When the non-party group is excluded and a direct comparison is made of the Republicans and the Democrats, the sum of the chi-squares exceeds the one percent level of confidence. There can be little doubt that the Republicans were more positively responsive to the speech than were the Democrats. There appears also to be a relative difference between the two groups. The actual plus changes among the Democrats fall short of the expected number by fifteen percent of the latter, whereas among the Republicans the actual number of plus changes exceed the expected number by fifty-three percent of the latter. The Republicans also show a disproportionately small number of negative changes of opinion.

As was indicated before, the subjects were asked to place a check on the general rating scale at the bottom of the response sheet as an index of their evaluation of the speaker's delivery, and to comment on the same in the space below. They were carefully instructed to consider the speaker's delivery independently of the merits of his argument.

For purposes of analysis, the unit ideas contained in the comments of the subjects were listed, those favorable to the speaker in one column and those unfavorable to the speaker in another column. For example, when the student wrote, "His manner is not authoritative and his voice is very bad," the phrases "manner not authoritative" and "bad voice" were listed as two separate unfavorable comments. Another comment was, "His speech was quite conversational and I think he was successful in making clear the ideas he is trying to present. However, there is a displeasing quality in his voice." "Conversational," "coherent," and "displeasing voice quality," were the unit ideas listed from this comment; the first two being favorable, the last being unfavorable. The results of this type of analysis are presented in Table 4. The independence values are given in parentheses alongside the actual frequencies. There can be no doubt that the two sets of frequencies differ significantly, the proportion of unfavorable comment being greater among the Democrats than among the non-party and Republican students.

Table 4

COMMENTS ON THE SPEAKER'S DELIVERY

Party Choice	Favorable	Unfavorable
Democrat	60 (79.07)	64 (44.93)
None	108 (92.46)	37 (52.54)
Republican	57 (55.47)	28 (31.53)

SUMMARY AND CONCLUSIONS

The Democratic and Republican college students in this study responded differently to a fifteen minute radio address by Hugh Johnson in which the speaker criticized the taxing and spending policies of the New Deal. The Democrats yielded proportionately fewer positive changes of opinion than did the Republicans, and indulged in proportionately more negative comment on the speaker's delivery. There are trends in the data which suggest that the Democrats tended to express their relative negativism in unfavorable comments about the speaker's manner of talking, whereas the positive suggestibility of the Republicans expressed itself in the acceptance of the speaker's opinions. The writer has no ready explanation for this latter difference between the two party groups. The identification of parent-student political party choice indicates that in many cases the basic point of view was largely the result of conditioning in the home, rather than personal analysis. It may therefore have been easier for the Republicans to accept propositional ideas which were consistent with their general leanings, than for the Democrats to reject plausibly stated opinions which ran counter to their political position. Under such conditions the experience of the latter group might be one of irritation, which found easiest outlet in the making of unfavorable comments about the personal behavior of the speaker. These points of criticism were not manufactured, as was clearly shown by the fact that the other two groups made similar comments about the speaker's voice quality, melody, enunciation, etc. The real difference was in the fact that the speaker's faults in delivery had greater stimulus value for the Democrats than for the other two groups. In this connection, the comment of one of the Democratic students is probably significant, "I found that at times it took a great deal of effort to pay attention to his speech. This may have been due to the fact that I wasn't particularly in favor of his opinion."

A METHOD OF MEASURING THE SATISFACTION OF WANTS

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Although there have been numerous analyses of family budgets and generalizations concerning consumptive behavior of different types of families, there have been few studies of individual satisfaction with level of living and kind of living. Simultaneously and independently Cottam[1] and the author[2] attempted to study satisfaction with family living.

The germ of the idea for the present study came from the formula: satisfaction equals possessions over wants. The satisfaction ratio could be increased either by increasing the numerator or by decreasing the denominator. The problem was to get some measure of wants and of the degree in which they are satisfied. After surveying much of the available literature related to his purpose, the author concluded that it would be of no value to distinguish between the terms want, wish, and interest. The term want is defined verbally as an attitude of approaching or attaining a given value. Satisfaction is measured by the amount of tension present as a result of the degree to which the value is attained.[3] General satisfaction would represent a summation at a given time of satisfactions with all the values desired by a given individual.[4] The author realized that he could not tap all the wants of each individual, since to do so would require a separate scale for each of interminable length. Therefore he tried to develop a list which would be

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[1]Mangus, A. R. and Cottam, H. R., Summary and Conclusions Based on a Study of Level of Living, Social Participation and Adjustment of Ohio Farm People, Mimeographed Bulletin, Ohio State University and Ohio Agricultural Experiment Station, Columbus, 1940.

[2]McVoy, E. C., A Study of Wants and Their Satisfaction Among a Sample of Rural People in Minnesota, Unpublished Ph. D. Thesis, University of Minnesota, 1941.

[3]Cf. Lundberg, Geo. A., Foundations of Sociology, Macmillan, New York, 1939, p. 272.

[4]Cf. Troland, L. T., The Fundamentals of Human Motivation, D. van Nostrand, New York, 1928, pp. 290-295.

Table 1

ITEMS USED IN THE WANTS AND SATISFACTION SCALE

HOUSE AND YARD
- House
- Room in house
- Lawn
- Central heating plant
- Roof on house
- Kitchen stove
- Play space in yard
- Bathroom(s)
- Flower garden
- Living room furniture
- Paint on house
- Screens on house

HOUSEHOLD CONVENIENCES
- Electricity
- Washing machine
- Refrigerator
- Sewage disposal system
- Telephone
- Running water
- Vacuum cleaner
- Hired help in home
- Radio

FOOD
- Food
- Oranges
- Meat
- Fruit
- Milk and cream
- Fresh vegetables

CLOTHING
- Clothing
- Coats

EDUCATION
- Education (self)
- Education (children)
- Children's schools
- Magazines
- Public library books
- Books in home
- Newspapers

HEALTH
- Hospital
- Way of paying health bills
- Medical care
- Dental care
- Optical care
- Care of mother before and during birth of children
- Family physician

RECREATION
- Recreation facilities (self)
- Recreation facilities (children)
- Outdoor sports
- Movies
- Concerts
- Vacations
- Travel
- Sleep
- Rest

PARTICIPATION
- Neighborhood
- Friends
- Visits to friends
- Visits from friends
- Parties you give
- Parties you attend
- Community

WORK CONDITIONS
- Hours of work
- Hired help
- Monotony of work
- Strenuousness of work

AUTOMOBILES
- Automobile

SECURITY
- Old age care prospects
- Life insurance
- Auto insurance
- Savings
- Children's job prospects
- Insurance on house
- Security of work

general enough to include most of the basic wants of the majority of people in Western culture, but specific enough to have meaning to the subject when questioned.

The schedule actually used was devised by examination of categories of items in various consumption studies, particularly those reported by Zimmerman.[5] It is valid probably only for American married couples of relatively low socio-economic status, and might not be applicable to all groups within these limits. Table 1 gives a list of items used in the scale, classified into eleven categories. Items related to religion, government, and credit facilities were included innthe original schedule, but they were not used in the final scoring, because of the unsatisfactory nature of the replies received. The items included were selected arbitrarily, with a view to getting a few key items which might be diagnostic. Following is a reproduction of the top portion of the schedule.

WANTS AND SATISFACTION (Use √ for yes 0 for no.)

	Have	Like	Quality	Quantity	Present situation					REMARKS: In what way is situation unsatisfactory?
					E	G	F	P	VB	
	I	II	III	IV	V	VI	VII	VIII	IX	
Electricity			xx							
Automobile										
Oranges										
Washing machine				xx						
Neighborhood	xx	xx	xx	xx						
Old age care prospects	xx	xx	xx	xx						
Hospital				xx						
Room in house	xx	xx	xx							
Clothing	xx	xx								
Meats	xx	xx								
Outdoor sports			xx							

In the columns of thesschedule are spaces for checking, with respect to each item: 1, now have or have available; 2, do not have, but would like to have; 3, would like better quality; 4, would like greater quantity; and a five-point scale for rating the present situation with regard to the item--5, excellent, 6, good, 7, fair, 8, poor, 9, very bad. In the schedule, items were mixed at random, in order to avoid danger of a halo effect. In the attempt to get an index of general dissatisfaction on the items covered, several methods of weighting were tried. It was decided at the outset to give all items equal value, although it was obvious that the items do not represent

[5] Zimmerman, C. C., Consumption and Standards of Living, D. van Nostrand, New York, 1936.

equal units of dissatisfaction. In scoring the various columns, the following weights were given: Deprivation score: for each check in column 2, 2 points; for each check in columns 3 and 4, 1 point. Dissatisfaction score: for each check in column 5, zero points; in column 6, 1 point; in column 7, 2 points; in column 8, 3 points; in column 9, 4 points. When the total Dissatisfaction score is divided by 71, the number of items, the resulting quotient is an index which shows the average dissatisfaction of the subject in terms of the ratings given. Table 2 gives mean Dissatisfaction scores. After 47 of the schedules had been taken, the Deprivation and Dissatisfaction scores were correlated. Since the r was .90 (S.E., .03), it was decided that both measured essentially the same phenomenon. Thereafter, the Dissatisfaction score was used as an index.

One of the criticisms leveled against the scoring method described above was that the items were non-comparable--that dissatisfaction, say, with meats the family consumed would not contribute an equal amount to total Dissatisfaction that dissatisfaction with the heating system of the home would. Even more untenable, it was argued, would it be to compare a complex, non-material item such as "friends" or "parties to attend" with a relatively simple, material items such as a vacuum cleaner. One answer to the criticism of giving equal weights is that there are enough items so that the differences in value would tend to equalize for the whole scale. In order to be sure that this factor was not neutralizing the diagnostic value of the scale, the author sent a supplementary schedule to the subjects, asking them to rate each item according to its importance to them, on a five-point scale. When 26 of the replies had been sent in, the results were tabulated and the items were ranked in order of importance attributed to them by the subjects. From this ranking, weights of 1, 2, 3, and 4 were given, and a new dissatisfaction score was computed, using the weights. The weighted scores were then correlated with the raw scores for 47 schedules, with a resulting r of .97 (S.E., .01). Thereafter, the raw scores were used.

In addition to the check list, the schedule contained questions as to preferred place of living, a question concerning disposal of a cash gift, and a set of questions about tenure status, personal worries, and other matters. Along with the schedule devised by the author, the following instruments were used: the Oklahoma Farm Family Socio-Economic Status Scale; the Chapin Social Status Scale; the Chapin Social Participation Scale; and the Rundquist-Sletto General Adjustment Scale.

The county selected for the study was Isanti County,

Minnesota, forty miles north of the Twin Cities, distinctly rural, and about average for the state in indices of productivity and farm income. It is located in Mangus' Rural-Farm Region VII, the Upper Mississippi River:[6] Following is a portion of his description of this area:

> This region is culturally similar to the Upper Midwest Region although the land is poorer, a different type of agriculture prevails, and a much smaller proportion of the farms is tenant-operated... The region ranked seventh from the top in plane of living, third from the bottom in ratio of children to women... The per capita value of farm land is less than one-half that in the adjacent region to the south. On the margin between these two regions corn-hog farms give way to intensive dairy operations in the Upper Mississippi River Region.

Isanti County is somewhat lower than its region in plane of living, fertility, tenancy, percent of farm wage laborers, and percent of non-farm population.

The county is not a clear-cut sample of any large area. It might be safe to generalize from it to several surrounding counties in east central Minnesota and west central Wisconsin. Since the study was exploratory in nature, wide sampling was not considered essential. Furthermore, in the village and farm comparisons, many factors were roughly equated, so that the generalizations concerning rural and village differences might have a broad application.

Within the county, sampling was carefully done. By use of a map showing all farmhouses in the county, it was possible to employ a random sampling technique, with approximately a 3% sample, 60 families in all. Within the village of Cambridge, the same method was used, the 52 cases interviewed forming a 17% sample. The woman of the house was the one interviewed.

Fourteen substitutions were made in the farm sample, 6 because of refusal to grant an interview, and 8 for other reasons. The next nearest house was taken as a substitute. In the village, there were 2 substitutions because of refusal and 8 for other reasons.

All the interviews were taken at the homes of the

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[6] Mangus, A. R., Rural Regions of the United States, Federal Works Agency, Work Projects Administration, Division of Research, Washington, 1940.

subjects. Since no appointments were made, the author thought it advisable to have some means of identification. An article concerning the study was sent to the leading county paper. In addition, the author obtained signatures of several well-known county residents to a letter of introduction, which he presented to the subject as a means of establishing confidence. In the farm interviews, the author thought he obtained a more cordial reception when dressed in a leather jacket and hunting cap. In the village, he wore a conventional suit. Farm people tended to be extremely cordial or extremely antagonistic, whereas most of the village people showed a matter-of-fact acceptance of the project. Villagers seemed, on the whole, to be more articulate. In all parts of the schedule except the General Adjustment scale, the interviewer did the recording of the information. The Wants and Satisfaction portion was checked by the interviewer on the basis of responses of the subject. The questions were asked with a view to making them meaningful to the subject, and the value of the reply was judged by the questioner. For the questions related to columns five through nine of the schedule, the author presented the subject with a card on which were printed the words: "excellent," "good," "fair," "poor," and "very bad." The subject chose the word which seemed best to apply the his "present situation" with the item at hand.

In Table 2 mean Dissatisfaction scores for farm and village groups are given. Critical ratio of the farm and village means was found to be 9.3. In interpreting the figures of the table, we might say that the farm people interviewed considered their way of life "fair" and that the village people considered theirs "good."

Table 2

MEAN DISSATISFACTION SCORES

	N	Dissatisfaction Scores(m)	Standard Deviation
Total group	112	1.63	0.45
Farm	60	1.89	0.35
Village	52	1.30	0.31

Most of the analysis of the study was done by correlation technique and by comparison of mean scores of various groupings of subjects. Critical ratios were employed to test significance of differences in these means. Table 3 shows correlations between the various factors involved in the study.

Table 3

CORRELATIONS BETWEEN VARIOUS FACTORS IN THE WANTS AND SATISFACTION STUDY

Description of Factors

1. Dissatisfaction. The higher the score, the greater the dissatisfaction.
2. Socio-Economic Status. The higher the score, the higher the status.
3. Social Status. The higher the score, the higher the status. Obtained for village families only.
4. General Adjustment. The higher the score, the lower the adjustment.
5. Participation. The higher the score, the greater the participation.
6. Income. Obtained for village families only.
7. Number of children at home.
8. Age of husband. Highly correlated with age of wife.
9. Wife's yearsoof education.

"t" refers to the whole group
"f" refers to the farm women
"v" refers to the village women

Factors Correlated	Group	N	r	S.E.
1 and 2	t	112	-.73	.04
1 and 2	f	60	-.52	.10
1 and 2	t	112	-.82(eta)	.03
1 and 2	v	52	-.65	.08
1 and 4	t	89	.63	.06
1 and 4	f	52	.30	.13
1 and 4	v	37	.39	.14
1 and 5	t	112	-.41	.08
1 and 5	f	60	-.11	.13
1 and 5	v	52	-.40	.12
1 and 7	t	112	.21	.09
1 and 7	f	60	.47	.10
1 and 7	v	52	-.20	.13
1 and 8	t	112	.17	.09
1 and 8	f	60	-.20	.12
1 and 8	v	52	.34	.12
1 and 9	t	112	-.34	.08
1 and 9	f	60	-.06	.13
1 and 9	v	52	-.33	.12
2 and 3	v	52	.84	.04
2 and 5	t	112	.66	.09
2 and 5	f	60	.57	.08
2 and 5	v	52	.66	.05
3 and 6	v	52	.76	.06

Following is a set of general conclusions which the study seems to warrant, for the area sampled:

1. The nature and extent of wants and the degree of their satisfaction differ with variations in age, occupation, place of living, nationality, education, socio-economic status, social participation, and family composition.

2. Degree of satisfaction tends to increase with income and socio-economic status. There is a marked relationship between these two factors, somewhat less so at the extremes, and stronger for village than for farm women.

3. Degree of satisfaction increases with amount of social participation. Correlation between these two factors is low for the village women, negligible for farm women.

4. Degree of satisfaction increases with degree of general adjustment. Association between these two factors is moderately high, somewhat lower for farm than for village women.

5. Degree of satisfaction increases with amount of happiness according to a self-rating.

6. Degree of satisfaction is not clearly related to number of children at home; for farm and village women together, the correlation is low negative for farm women it is moderate negative, and for village women it is low positive.

7. Degree of satisfaction increases with amount of education. Correlation is low for village, negligible for farm women.

8. Degree of satisfaction is not clearly related to age. Correlation is low negative for village, low positive for farm women.

9. Satisfaction is related to nationality and to nationality of parents. Foreign-born women on farms have a higher degree of satisfaction than the native-born, but the native-born are better satisfied in the village. For both farm and village, those of foreign-born parentage are better satisfied than those of native-born parentage.

10. Satisfaction is related to receipt of relief and other public aid. Those receiving aid show a significantly lower degree of satisfaction than those not receiving aid.

11. As compared with farm women, village women have a higher socio-economic status, higher degree of satisfaction and of general adjustment, a higher self-rating of happiness, higher amount of social participation, more years of education, fewer children; they average several years younger; they contain somewhat fewer foreign-born and persons of foreign-born parentage; fewer receive public relief or aid.

12. When matched for socio-economic status, participation, number of children at home, school grade completed, and age, farm and village women still differed significantly in satisfaction and general adjustment and happiness.

13. In the disposal of a cash gift of $1,000, both farm and village women would use it most often for some purpose related to the home. Farm women, more frequently than village, would spend the money for food, clothing, living expenses, and automobile, while village women would more often spend it for travel, children's education, and items less closely related to the physical necessities of living.

14. In choice of a place of residence, 60% of the farm women prefer farm, whereas 88% of the village women prefer village.

15. In comparing general categories of items in family living, it is found that farm women show least satisfaction with clothing, automobile, security, and work conditions. Village women show least with clothing, automobile, work conditions, recreation, and health.

16. Farm women tend to rate all items less important than do village women. Of the major categories given, only automobile, clothing, and work conditions were rated more important by farm women. The two groups concurred in giving the greatest weight to categories of food, health, clothing, and security, least to work conditions, recreation, and participation.

THESE OPINION POLLS AGAIN!

Albert B. Blankenship
N. W. Ayer & Son, Inc.
Philadelphia, Penna.

Last night when I sat down in my chair to read the latest copy of my favorite magazine, I learned that just preceding the Japanese declaration of war, 83% of the American public expected us to be in the war before it was over. On a radio broadcast just last week I heard that (before appropriate action had been taken by Congress) 72% of the public had wanted the Neutrality Act repealed to the extent of permitting ships to carry supplies to Britain. My daily newspaper carries poll results several times a week.

With this barrage of "what the public thinks," it is scarcely a wonder that some two-thirds of our Congressmen are supposed to be influenced by opinion survey returns.[1] Since these polls of opinion are so greatly entering into our scheme of things, it is hardly matter for wonder that they are being scrutinized so carefully, and attacked so generally. Along with the attacks by columnists and Congressmen, there has been some analytical criticism, such as that by Dr. Stagner which appeared recently in this publication.[2] Analyses by social scientists trained and experienced in the polling procedure should aid the maturation process of polls. Even the less scientific attacks from laymen are helpful in focusing attention on techniques; they suggest a sensible note of caution in interpreting poll results.

Now that the United States has entered this war, it seems likely that polls will be scrutinized even more carefully. There is little question that the government is and will be influenced by poll results in its conduct of non-military affairs. Before the war began, there were frequent charges, perhaps justified, that propagandists distorted polls as a means of influencing public opinion. It seems entirely likely that there

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[1]G. F. Lewis, Jr., Congressmen look at the polls. Public Opinion Quarterly, 1940, 4, pp. 229-231.

[2]Ross Stagner. A comparison of the Gallup and Fortune polls regarding American intervention policy. Sociometry, 1941, 4, pp. 239-258.

have been misleading polls, as well as misleading interpretations of poll results. In war-time, then, it is more important than ever to examine critically the validity of polls, and the factors which affect this validity.

Stagner, in his discussion of the Gallup poll,[3] lists four principal sources of error in returns: (1) the selection of topics on which surveys are made, (2) the phrasing of the questions to be asked, (3) the selection of the population sample to be queried, and (4) the manner of approaching the interview subjects.[4] His principal criticism of the AIPO results is based upon the way the questions are asked, which he believes produces biased responses. Stagner's conclusions about the weighted nature of the AIPO questions were based largely upon a study of mine made about three years ago.[5] Dr. Gallup's reply[6] to Stagner was also based somewhat upon material appearing in this same report.

Stagner's point about the selection of survey topics might be examined for a moment. It is unquestionably true, as he points out, that any selection of topics is subjective, but it is also reasonably certain that the more trained the men who cooperate in selecting the topics, and the more varied the fields of interest they represent, the less chance there should be for selection of issues of particular interest only to a small segment of the population. Similarly, the less chance there ought to be for selecting topics which are useful in promoting one limited point of view. The American Institute[7] insists that the issues must deal with all possible aspects of the contemporary scene; must be of direct interest to the mass of the public, and issues on which the masses have had opportunity and reason to form opinions; must be of current interest; and must impinge on everyday life experiences of ordinary people.

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[3]Although popularly called "the Gallup poll," the official name of the organization is the American Institute of Public Opinion. In the remainder of this paper this title sill be abbreviated to "A.I.P.O."

[4]Stagner was particularly concerned with issues relating to isolation and intervention.

[5]A. B. Blankenship, The influence of the question form upon the response in a public opinion poll. Psychological Record, 1940, 3, pp. 345-424.

[6]George Gallup, Question wording in public opinion polls. Sociometry 1941, 4, pp. 259-268.

[7]George Gallup and S. F. Rae, The Pulse of Democracy. New York: Simon & Schuster, 1940. See pages 92 and 93.

Nevertheless the American Institute syndicates its results to newspapers. Although the Institute has had releases printed even when they conflicted with editorial policy,[8] this is not sufficient answer. If the material were not generally satisfactory to a newspaper, that paper would not subscribe to the service.

Stagner hypothesizes that the AIPO sample of respondents is not as valid as that obtained by the Fortune poll. He cites as evidence for this the fact that in the 1940 Presidential election the Fortune prediction was less than 1% in error from election returns, while the American Institute was approximately 3% in error. Let's look at the record.

Accuracy in predicting a national election is most exactly expressed in terms of the number of states and electoral votes correctly allocated, since Presidents are elected in these terms rather than by popular vote. Fortune, however, made no effort to predict state or electoral votes, although AIPO did. Hence the two cannot be compared on this basis. Neither is it fair to compare the two results in terms of a national vote, since AIPO had taken on the more difficult job of predicting state returns and electoral votes.

Prediction of national vote, in addition, is not a highly exact measure of accuracy. A national survey can make many errors in sectional or state predictions, and still come close to the national figure because errors in some sections will cancel out errors in other areas. Apparently, then, accuracy of the Fortune and AIPO predictions can best be compared in terms of sectional figures. When this comparison is made, it is found that the average section error for Fortune was 7.3%, for AIPO was 2.3%.[9] This comparison should make it clear that there is no justification for Stagner's conclusion that the Fortune sample of respondents is superior to that of AIPO.

The AIPO sample itself is not perfect; the 1940 Presidential prediction revealed a constant overprediction of the Willkie vote. In 35 states AIPO overestimated the Willkie vote, while the Roosevelt vote was overpredicted in only 12 states. The errors favoring the Republicans were more pronounced (averaging 2.9%) than those favoring the Democrats (averaging 1.1%). Fortunately AIPO seems well aware of its sampling problems, and is striving continuously to improve its sample. However there is no indication that this sampling error has in

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[8] Gallup and Rae, op. cit.

[9] Daniel Katz, The public opinion polls and the 1940 election. Public Opinion Quarterly, 1940, 5, pp. 52-78.

any way contributed to AIPO results favoring intervention rather than isolation, with which Stagner was concerned.

A third aspect of polls which will affect their validity is the problem of interviewing respondents. Stagner dismisses this topic with little consideration, stating that apparently the only remaining task here is to better match interviewer class-status with that of the respondents. Actually, the problem of interviewing appears to be one of the greatest questions of the entire procedure. Katz[10] shows that the sample of respondents is likely to contain too high a proportion of the upper socio-economic respondents, since most interviewers (who tend to interview persons of their own level) come from the upper middle group. Distance between status of the interviewer and his respondent may also result in evasive or no answers. Many problems arise in the instruction and supervision of the interviewers, but time cannot be spent here in discussion of these relatively minor points, whose mastery is a possession of the trained research man. More important and insidious is the possible influence of interviewer bias in the results obtained by the experienced and trained investigator.

Katz[11] states that the interviewers used by the American Institute in the 1940 Presidential poll did not obtain responses correlated to their own political beliefs. More such analyses are needed. In order to show the influence of interviewer attitudes upon results, frequent breakdowns of individual interviewer's results should be made and publicized.

There was an opportunity to make such a breakdown in the Irvington study.[12] Three interviewers each obtained samples of 300 voters entirely comparable in 9 sampling characteristics measured. There are probabilities above Fisher's 95% level that the differences by interviewer are statistically reliable. Interestingly enough, these interviewers all had completed many years of schooling, all had considerable experience in survey interviewing, and each was personally supervised for the particular poll. Despite all of the safeguards taken against interviewer bias, this was a factor affecting accuracy of the study. In all fairness it should be admitted that the usual nationwide study uses so many workers, of so many varieties, that any biased effect may cancel out.

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[10] Katz, op. cit.

[11] Katz, op. cit.

[12] A. B. Blankenship, The effect of the interviewer upon the response in a public opinion poll. Journal of Consulting Psychology, 1940, 4, pp. 134-136.

This discussion naturally raises the question of what type of person makes a good interviewer. We don't know. One of the first attempts at an objective approach to this problem was recently made[13] in an exploratory study. An interviewer rated as "superior" by his supervisor apparently tends to be one with more obstacles in his life--physical and economic--than one rated "inferior." Unfortunately this beginning does not solve the practical problem of selecting a good worker.

The problems of question-phrasing raised by Stagner might next be considered. His discussion on these points was divided into two sections--one on question construction (general construction of the question), and the other on wording (particular words used). His discussion of question-form depends largely on the Irvington study already mentioned.

From consideration of the Irvington results, Stagner concludes that (1) the use of either a straightforward positive or negative statement tends to overestimate the proportion of respondents favoring or disapproving a policy, and (2) the objective form (in which both alternatives are presented) tends to give more accurate results than either the positive or negative phrasing. He then classifies both the AIPO and Fortune questions on intervention-isolation sentiment in terms of the criteria used in the Irvington study, except that in place of defining positive and negative in terms of acceptance of an idea (language), he defines a positive question as one which puts forth an interventionist proposal in the affirmative, a negative question as one which puts forth an isolationist proposal in the affirmative (sentiment).[14] What Stagner has done in the way of classifying can best be shown by an example of two questions, the first of which Stagner calls positive subjective, the second of which he terms negative subjective.

> Do you think the U.S. should forbid shipment of arms or ammunitions from this country to Japan?
>
> Do you think the U.S. should forbid shipment of arms or ammunitions from this country to China?

Actually, according to the definitions used in the Irvington study, both of these questions would be negative subjective. The

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[13] A. B. Blankenship, D. I. Manheimer, and J. L. Otis, Characteristics of opinion poll interviewers. Paper at American Psychological Association meetings, Northwestern University, 1941.

[14] This error was mentioned by Gallup in his reply to Stagner.

positive form would use the word "permit" in place of "forbid."

Applying the Irvington definitions, we learn that the proportion of each type of question asked in the Fortune and AIPO polls is quite different from what Stagner shows. Table 1 indicates the extent and nature of these differences.

Table 1

FREQUENCY OF QUESTION TYPES FOR AIPO AND FORTUNE POLLS USING (A) STAGNER DEFINITIONS, AND (B) IRVINGTON DEFINITIONS

	AIPO				FORTUNE			
	A		B		A		B	
	No.	%	No.	%	No.	%	No.	%
Subjective (two alternatives)	0	-	9	9	0	-	0	-
Objective (two alternatives)	27	26	0	-	0	-	0	-
Objective with check-list	3	3	2	2	5	28	1	6
Subjective with check-list	0	-	20	19	8	44	11	61
Negative objective	2	2	0	-	1	6	1	6
Positive objective	10	10	11	11	0	-	1	6
Negative subjective	4	4	10	10	0	-	0	-
Positive subjective	56	55	51	49	4	22	4	22
	102	100	103	100	18	100	18	100

This table indicates that these errors in classifying (and there were others in addition to his definition of positive and negative question-forms)[15] made a serious difference in the proportion of each type of question-form, particularly in the case of AIPO questions.

Let's follow through these changes and see whether or not they affect Stagner's conclusion that only 29% (objective plus objective with check-list) of the AIPO questions were unbiased in that two alternatives were presented. Before this can

[15] Stagner listed no "subjective" questions (questions containing the word "you" followed by two alternatives) in either the AIPO or Fortune polls, while the AIPO poll had 9 of these. In addition, there were no "objective" questions at all in the AIPO poll (a direct proposal of two issues without use of the word "you"), though Stagner listed 27 of these. And although Stagner found no subjective questions followed by a check list, there were actually some 20 of these in the AIPO list of questions.

be done, we must find out towards which direction each of the AIPO questions was supposedly biased. We may immediately disregard the subjective, the objective with check-list, and the subjective with check-list, since our revised classification of these 30% show them to be entirely unbiased in that all alternatives are included within the question form itself.

If there is any bias in the other wordings, there must be a bias either in the direction of intervention or isolation, since it was only these issues Stagner considered. Table 2 shows in which direction each of the wordings presumably indicated bias. In place of Stagner's 65% for pro-intervention, we now have 66% (68 of 103); in place of his 6% isolationist queries, we now have 4% (4 of 103). In other words, Stagner's errors in classification still did not seriously affect the proportion of apparent bias in either interventionist or isolationist sentiment. This last statement assumes that the Irvington results were applicable, and that they warranted generalization with respect to the American Institute poll. The original Irvington experiment must be considered before any conclusion is reached concerning this assumption.

Table 2

APPARENT DIRECTION OF BIAS IN AIPO PHRASING

	Intervention No.	Isolation No.	Total No.
Negative objective	0	0	0
Positive objective	10	1	11
Negative subjective	10	0	10
Positive subjective	48	3	51
Total	68	4	72

Gallup, in his reply to Stagner, makes the point that the Irvington experiment does not warrant generalization.[16]

[16] There are two principal grounds, both mentioned in the Irvington report: (1) the study was made in only one town, and (2) a wide range of subject matters was not included. There is actually a third good reason why this generalization is not justified: the interviewers and their supervision were both quite different from those used on American Institute polls. There were only 10 workers in the Irvington study, and they were all personally supervised by the poll conductor. Gallup uses hundreds of workers in any study, and it would be impossible for him to supervise personally each one.

This is entirely correct; there is no justification for applying the Irvington results to any other poll. There is no question that the limited scope of the Irvington study makes generalization highly questionable. Nor are there other broad experiments on question-phrasing to aid in generalization. It surely appears that Stagner's criticism of AIPO on the basis of question-form is not justified from the evidence available in the Irvington study, upon which he depends so heavily.

Stagner claims that many of the words or phrases used in the American Institute questions cause bias. He has two points here: (1) that emotionally-toned stereotypes, when included, influence replies, and (2) that the use of prestige-bearing names in a question will bias responses. Five experimental studies by various investigators are cited by Stagner in support of these contentions. There seems no question that in certain situations both of these factors will bias the obtained results. Stagner himself states (p. 253) that "....it has been shown that these factors influence results only slightly if opinion is highly stereotyped....." Gallup's reply emphasizes the small effect of these factors when opinion is well-formed--evidence produced in the Gallup surveys are more in agreement

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(footnote cont'd.)

Gallup poses the idea that generalization is unwarranted from the Irvington study for an additional reason. He states that too few of those interviewed actually cast ballots in the election, thus destroying the comparability of the poll results with the election returns. This hypothesis is not supported by fact. The total poll results showed 53.2% in favor of the amendment, while 50.0% cast ballots in its favor. This difference of 3.2% is well in Gallup's own 4% "margin of error."

Actually, there were only small differences in attitudes between those respondents who were registered voters intending to vote, and those registered voters who did not intend to vote. In any case, to make a contention of the sort Gallup does here is to deny the entire basis of random sampling. To carry this reasoning to its logical conclusion, there is no point in having pre-election polls, since not all of those registered will actually vote anyway!

The original Irvington data showed all five samples of voters used for validation purposes comparable in all 9 sampling characteristics measured. It just does not seem reasonable to suppose that the samples are now different in terms of the proportions of people who voted, or in the way the voting proportion cast ballots. Unfortunately since almost three years have elapsed since the election, there is no objective way in which to make such a check.

on this point than the casual reader might believe. Since most of the American Institute questions indicate so clearly that the large proportion of the public favor interventionist suggestions, probably there was not a great deal of such bias in the phrasings.[17]

The Stagner paper was concerned primarily with the construction and wording of questions, and their influence in suggesting a response. The present analysis leaves little doubt that the evidence does not prove bias in any of the listed AIPO questions.

A point perhaps fully as important as that of possible bias is the proportion of "don't know" answers obtained with various question phrasings. Other things being equal, the phrasing producing fewer of these indecision answers is the better question. Fewer such responses probably indicate that more people understand the question. A low proportion of "don't know" replies probably indicates that the issue is one on which opinion is heavily crystallized. All in all, the researcher can place more confidence in his results if his "don't know's" total only 5% rather than 50%. The entire relation of the affirmative and negative replies might change if the 50% were prevailed upon to state a definite opinion.

On this issue of securing few indecision responses there is sufficient research to justify some generalization. The evidence indicates that a positively worded question is more readily understood by respondents than is one worded negatively. Wang[18] suggested that attitude statements should be worded positively. Some 14 years before his statement, Wembridge and Means[19] presented evidence showing that negatively worded issues were more frequently misunderstood than those worded positively. Results from the Irvington study support this conclusion.[20] All five of the positive objective forms, as contrasted with the negative objective forms for the same issues, gave

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[17]Gallup states in no uncertain terms that one of the conclusions of the Irvington study was that the question form mattered least when opinion was definitely crystallized on an issue. In the Irvington paper this was presented as a belief of the author's, not as a conclusion arrived at from consideration of the experimental data.

[18]Wang, C. K. A., Suggested criteria for writing attitude statements. Journal of Social Psychology, 1932, 3, pp. 367-373.

[19]Wembridge, E. R. and Means, E. R., Voting on the double negative. Journal of Applied Psychology, 1918, 2, pp. 156-163.

[20]See tables 44 and 45 of the Irvington report.

fewer "don't know" responses. Critical ratio computation shows that there are some 98 chances in 100 that the difference is reliable statistically. Thus we have independently collected evidence, from isolated studies, which suggests that affirmative, or positive wording, is more clearly understood thannthe negative. This does not indicate that phrasing containing both alternatives may not be just as clear; the only evidence concerning this point comes from the Irvington study, which shows that the objective phrasing obtains an addition 5.1% "don't know" reply over the positive objective. Critical ratio here is so high that there are more than 99 chances in 100 of a real statistical difference.

There is a related question here, concerning the use of words which may be difficult or unknown to many of the respondents. Among the Institute questions listed by Stagner, there are 5 that contain words which are apparently among the more difficult in the English language. One of these is neutrality (used twice); another is destroyer (used three times). In fairness to AIPO it should be mentioned that the word destroyer, in two of the questions, was joined with the word ships, making it more meaningful to many respondents.[21] Moreover, the present international situation undoubtedly increased the familiarity of these words to a number of respondents. In any case, a record of 5 or less questions containing difficult words out of a total of 103 questions is good. If this is a fair sample of all Institute questions, there cannot be any serious contention about the level of vocabulary used.

Another factor which may influence the proportion of "don't know" answers is the particular questionnaire--the surrounding questions--in which the particular question is used. AIPO never publishes the entire questionnaire in which the question has been included, but from other sources it is possible to obtain some estimate of how strongly this factor may operate. In nationwide studies of two types--one composed entirely of a list of buying questions (except for one or two opinion questions), the other utilizing only opinion questions--several questions have been phrased identically. The average proportion of no opinion answers with the question in a buying context was 27%; it was only 16% when the question was in the

[21] Difficulty of these words has been judged by their position in the list presented by E. L. Thorndike, in his Teachers' Word Book of Twenty Thousand Words (New York: Teachers College, 1932). Thorndike has compiled frequency of word-use of 20,000 words found in common sources of children's literature.

questionnaire composed of other opinion items. It seems fairly safe to assume from these results that the more closely the questionnaire is concerned with one problem, whether it be intervention-isolation, or whether it be dentifrice buying habits, that fewer "don't know" answers will be obtained to any one question. How AIPO stands on this score is impossible to determine.

Validation of opinion questions is another issue raised by both Stagner and Gallup. Stagner has mentioned the possible comparison of the AIPC and Fortune questions on the same issue, but concludes that the question phrasing was so different in most cases that such a comparison was impossible. Stagner does make the point that on one particular issue, inquired about by both polls at roughly the same time, AIPO obtained more interventionist sentiment than did Fortune.

Theoretically this comparison of results obtained by two different polls on the same issue at the same time should give some indication of their validity. One would expect that the results should be close. There are, however, a number of reasons why the Fortune and AIPO results on any issue may not be comparable. Stagner has mentioned the first of these points--that the phraseology of the questions varies. We may be certain that the entire context of the questionnaire is different. This too would vitiate any comparison, as our example above has shown.

The samples of respondents obtained by the two services are different in the usual issue poll. Except in the case of elections, Fortune attempts to secure a cross section of the general population, while AIPO is concerned with using a cross section of voters on all of their polls. Obviously there may well be some differences in the opinions expressed by these two groups. Still another difference is that the type of interviewer and interviewing methods of the two vary. AIPO uses hundreds of workers, and cannot give them a great deal of supervision, or select them with the degree of thoroughness reportedly used by Fortune, which uses less than 100 workers on most of their surveys.

Gallup suggests that practical criteria of opinion--such as Congressional action--can be checked in an effort to determine poll accuracy. Heaven forbid! Since Lewis[22] suggests that two-thirds of our Congressmen are influenced by poll results, this scarcely seems an adequate criterion. Moreover, to get down to cases, consider a recent Congressional vote, and compare it with what AIPO found on the polls nearest the date of the action.

[22] Lewis, op. cit.

According to the AIPO results released for publication on November 5, 1941, 81% of the voters wished American ships to be armed, and 61% favored repeal of the Neutrality Act provision that American ships must be kept out of war zones. On November 10 the bill modifying the Neutrality act in accordance with both of these suggestions was passed by a House vote of 212 to 194, or a 52% majority. This 52 is not even close to the 81 or 61 listed by AIPO, yet the vote should be split in accordance with popular opinion if Congressional action is representative of opinion.

What then may be used as an index of opinion against which the accuracy of these polls may be checked? More and more of us in the survey field[23] are coming to believe that the most accurate indication is how a person behaves--what he does. The pre-election polls are commonly checked for validity by the election returns, and this appears to be common sense. As Link[24] observes, the poll that cannot be checked by some measure of behavior probably is of little value anyway. To use Link's example, it is pointless to measure morale unless the results of the survey can be compared with some objective indication of morale.

Polls made for private clients have sometimes included queries about attitude towards a number of companies. These attitudes can be checked against behavior of the respondent, whether it be buying behavior, listening to the company's radio program, etc. A recent exploratory study made by N. W. Ayer showed that a favorable attitude towards a particular company was indeed correlated with ownership of that company's goods, as one would naturally expect. Link cites examples to show that favorable attitudes towards specific concerns are also related to such objective behavior as attendance at fair exhibits, presence or absence of a company's traveling exhibits, etc.

This discussion of validation of polls against behavior has a distinct implication for question-phrasing, as suggested in an article over a year ago.[25] The question should be phrased in terms of past, present, or possible future behavior, so as to make it "close to home" for the respondent, rather than representing any abstract attitude. For instance, in place

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[23]As an indication of this point of view, see H. C. Link. The problem of validity vs. reliability in public opinion polls. (In manuscript)

[24]Link, op. cit.

[25]A. B. Blankenship, The case for and against the public opinion poll. Journal of Marketing, 1940, 4, pp. 110-113.

of asking "Do you like or dislike advertisements on the radio?" a recent survey phrased the question, "Do you ever turn down your radio when an advertisement is being broadcast?" However, validation is a subject on which a volume could be written, so the subject can be only high-lighted here.

The basic conclusion reached by this paper may be stated as follows:

> Although we are well aware of many possibe sources of error in polling, wide generalizations about phrasing, or even sampling, are not warranted present knowledge.

As corollaries of this conclusion:

(a) The Stagner generalizations about the leading nature of the AIPO questions are not warranted until some original experimental study using varying forms of these particular questions has been undertaken.

(b) According to available evidence, the AIPO questions are clearly stated.

(c) The AIPO appears to obtain a sample of respondents which is at least equally good as that used by the Fortune poll.

GRAMMAR VERSUS LOGIC IN PUBLIC OPINION POLLS

Comment on Dr. Blankenship's Paper

Ross Stagner
Dartmouth College

In the light of the events of December 7, 1941, the further discussion of American opinions about intervention and non-intervention seems preposterously out of date. For the sake of future discussions of method, however, I should like to make just a few comments on the remarks of Dr. Blankenship and of Dr. Gallup.[1]

My major criticism of the intervention questions in the AIPO surveys[2] was that too many of them followed patterns found by Blankenship[3] to overestimate public opinion in a direction which could be deduced from the phrasing of the item--an overestimation due to the tendency of the average citizen to agree with propositions presented to him. Other investigators besides Blankenship have found this "acquiescing tendency" and my reliance upon the Irvington study is somewhat exaggerated by both Gallup and Blankenship. Several references on this point are covered in my previous paper.

My criticisms were not based on matters of grammatical form. I sincerely hope that controversy over opinion polling will never reach that low point. The significant psychological problem is, it seems to me, that of the rôle of the "acquiescing tendency." The use of the words "positive" and "negative" in my comments assumed that we were talking about psychological attitude continua with respect to which a given opinion is positive or negative according as it favors or opposes a certain attitude-object.

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[1]Question wording in public opinion polls. Sociometry 1941, 4, 258-268.

[2]Comparison of the Gallup and Fortune polls regarding American intervention policy. Sociometry, 1941, 4, 239-258.

[3]Blankenship, A. B. Influence of question form upon response in a public opinion poll. Psychol. Record, 1940, 3, 345-403.

Blankenship cites the illustration of questions on shipment of munitions to China and Japan, which were identically phrased by the AIPO. Does this mean that these questions were identically perceived by the persons interviewed? Of course not. To an absolute pacifist, both might be "positive" questions because he is opposed to all munitions sales. But to most of us, these questions posed diametrically opposite policies, one aiding China and the other harming the Chinese. If any impression was given in my paper that I was concerned with the use of words such as "desirable" and "undesirable" in themselves, I am very sorry. My concern is purely with the relation of the statement as posed by the interviewer to the attitude-continuum which will determine the respondent's answer. This seems to me the only way in which the words "positive" and "negative" have any psychological significance, and it is the only way in which the data of the Irvington study seem logical.[4]

There are a number of points which both Blankenship and Gallup gloss over. E.g., the former concedes that Fortune interviewers are better trained and supervised than the AIPO workers, but apparently is unwilling to admit that this may have had some connection with the lower pro-intervention votes in the Fortune data. Dr. Gallup refers to the observation that question phrasing is effective primarily when opinion is not crystallized, then apparently moves on to the conclusion that intervention opinion was crystallized, disregarding the very contradictory data cited in my paper.

I am disappointed with Dr. Blankenship's low estimate of his Irvington study. While granting that it is not universally valid, I still consider it an excellent piece of research.

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[4]Since Dr. Blankenship and I seem to have semantic differences of a serious nature, it is not perhaps surprising that I cannot deduce how he arrived at the classification of AIPO items given in his Table 1. As shown in his Table 2, this re-classification does not vitiate my argument that the AIPO polls might easily be judged to be biased in favor of an interventionist policy.

ANNOUNCEMENTS

Helen H. Jennings, of the Advanced School Workroom of Teachers College, Columbia University, has been appointed Managing Editor of SOCIOMETRY to succeed J. G. Franz, who has resigned and will take a position on the Board of Contributing Editors. Helen H. Jennings has been associated with J. L. Moreno in sociometric and spontaneity work since 1929. In this and other publications she has made outstanding contributions to the theory of the social atom and to the sociometric analysis of leadership.

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With this issue, SOCIOMETRY enters its fifth volume--and sixth year of publication, the first issue having appeared in the summer of 1937. It was the first journal to dedicate itself to sociometry and interpersonal relations. During the five years of its existence it has progressively stimulated almost every department of the social sciences and has drawn into its orbit--some of them as contributors--many of the foremost leaders in the social sciences. Many terms like sociometry, interpersonal situation, psychodrama, sociometric test, sociometric technique, spontaneity test and spontaneity training, which were, at the time of the foundation of the Journal, either esoteric or new, have found nation-wide acceptance, use and abuse far beyond the social science domain.

REPORTS

SOCIOMETRIC CONFERENCES IN CONNECTION WITH THE ANNUAL MEETING OF THE AMERICAN SOCIOLOGICAL SOCIETY

Hotel Roosevelt
New York City, December 27, 28 & 29, 1941

The newly formed section on sociometry of the Annual Meeting of the American Sociological Society had an auspicious start under the chairmanship of Dr. William H. Sewell, of Oklahoma A. & M. College. The three papers read at the meeting of the section were: "The Relationship of Public Opinion Measures to Sociometric Procedures," by Paul F. Lazarsfeld, Columbia University, with discussion by Raymond F. Sletto of the U.S. Department of Agriculture, "Individual Differences in Personal Relationships," by Helen H. Jennings, Advanced School Workroom, Teachers College, with discussion by J. L. Moreno, Beacon, N.Y., and "The Preliminary Standardization of a Social Insight Scale," by F. Stuart Chapin, University of Minnesota, with discussion by George A. Lundberg, Bennington College.

CONFERENCE ON SOCIOLOGY AND SOCIOMETRY AS APPLIED TO NATIONAL DEFENSE

The opening note of this meeting was struck by J. L. Moreno, who emphasized the need for presenting to the authorities in charge of the national defense system the fact that sociometric procedures have been developed in recent years which would be very fruitful in the effort to select draftees more scientifically than heretofore. These procedures would also be useful, he went on to say, in the organization of army camps and fighting units, modelled as they are after procedures which have been worked out with apparent success in closed communities, resettlement communities and CCC camps. He referred particularly to sociometric and spontaneity tests.

George A. Lundberg reviewed the large number of social researches of all types which have, directly or indirectly, been made on problems of national defense, pointing out

especially the research, "The Prediction of Personal Adjustment," prepared by Paul Horst and associates under the auspices of the Social Science Research Council. In his conclusion, he recommended the application of sociometric procedures to army situations.

Paul F. Lazarsfeld discussed the importance of public opinion studies in relation to the nation at war.

F. Stuart Chapin discussed the importance of the planning and organization of researches of different types.

Leonard S. Cottrell, Jr., emphasized the need for bringing to the awareness of the government what the people are thinking at any given time about social issues, suggesting public opinion polls as the best means of bringing this about.

Leslie D. Zeleny and Leona M. Kerstetter discussed the question of maintaining the morale in school children in the present war-situation.

In the open discussion, the meeting reached its climax in a dramatic discussion of German military psychology and sociology as compared with what sociology and sociometry in this country have to offer. Howard Becker and Robert Schmid (the latter having brought back from Europe one of the most recent surveys of German military psychology) pointed out that in Germany certain forms, however simplified, of sociometric and spontaneity procedures are actually used throughout the Reich with the greatest possible effectiveness. J. L. Moreno indicated that there was a fundamental difference between training an individual to be able to meet situations spontaneously and drilling an individual for specific situations or emergencies possibly forthcoming. He pointed out that the Germans tend to follow the latter course rather than the former. He then emphasized the point that the Germans reserve the right to initiative and spontaneity for the leaders in a group, only. The balance of the group is practically omitted from the training of spontaneity.

Read Bain stressed the greater spontaneity of the average American soldier when compared with the average German soldier. It would be a mistake, he cautioned, to think that it would be an advantage to make the American soldier a duplicate of the Nazi-pattern. Such an effort, he said, would meet with the hearty resentment of the American soldier and, furthermore, rob him of the spontaneous qualities in which he is the superior. He pointed out that the Australian troops, for instance, are known, like the Americans, to be rather casual in their drill, but under battle conditions they show great resourcefulness and stamina.

CONFERENCE ON SOCIOMETRIC FIELD WORK AND A PROJECTED SOCIOMETRIC SOCIETY

This conference took place on December 27, directly after the meeting of the Section on Sociometry. The main topic of discussion was the project of a sociometric society. The scheme which met the most general approval was that the new society should be organized as an affiliate of the American Sociological Society and bear the same relationship to it as the American Psychometric Association bears to the American Psychological Association.

It was stressed by the discussers that the value of such a society could be manifold: it could standardize the growing sociometric terminology and the use of sociometric methods and techniques; it could aid in the planning and coördination of sociometric field work. The results obtained by one researcher could then be applied by another researcher who could begin a new research project with a better and broader foundation.

A resolution was moved and passed that a committee be formed which should further develop these ideas and make a report, with suggestions, during the next Christmas meeting of the American Sociological Society.

Louise Price: *Creative Work on the Campus*, Bureau of Publications, Teachers College, Columbia University, New York, 1941. pp. 437.

George A. Lundberg: *Social Research, A Study in Methods of Gathering Data*, Longmans, Green & Co., New York, London and Toronto, 1942. pp. 413.

Jessie Bernard: *American Family Behavior*, Harper & Brothers, New York, 1942. pp. 551.

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